FLIGHT & The AIRCRAFT ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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NOTICE OF REMOVAL.
The Offices—Editorial and Advertisement—of "FLIGHT and The Aircraft Engineer" are now at
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telephone No.: Gerrard 1828.
Teleg. Address: "Truditur, Westcent, London."

EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."— (*Sir Auckland Geddes, Minister of National Service.*)

UNDER this heading the *Morning Post*, which has always been bitterly and illogically opposed to the principle of a single Air Service, returns to the charge and indulges in a series of diatribes against everything and everyone. We are not at all clear what it is our contemporary is driving at, but its main grievance seems to be that the Air Council has not as yet taken over the R.N.A.S. and the R.F.C., and observes in continuation that the attempt to incorporate them has created chaos. At the bottom of our contemporary's indignation we seem to discern the personal note of dislike of Lord Northcliffe, who, as we know, declined to undertake the task of organising the Air Force, and of the present head of the Service, Lord Rothermere. We should not like to assert that the *Morning Post* has nothing but the merely personal motive of attacking people to whom it has a notorious dislike, or that there is not a substratum of sincerity in its attacks on the Government for giving way in the matter of the separate Air Service, but we certainly think it is a pity that the personal note was not left out. There is, we admit, room for two opinions on the wisdom of the decision of the War Cabinet to amalgamate the R.N.A.S. and the R.F.C. For our own part, we have never hesitated to advocate the course that has been taken—which we believe to be the right course—but we agree, at the same time, that there are weighty possible arguments against the change. Those arguments, however, are not sufficiently strong to discount those for the other course, but as the matter is one in which, as we have said, there is room for two judgments, each and every one has a right to his opinions and to express them. But in such cases the argument should be conducted on its merits, and any descent to personalities is to be deprecated. Besides, the moment one side is compelled to adopt the line of attack on personalities its case must be held to have gone by default. That is where the *Morning Post* has enormously lessened the value of its expressions. Not that there is very much in its arguments in the present case. Indeed, there are no real arguments adduced. The whole gravamen of the charge against the Government and the Air Council is that the R.N.A.S. and the R.F.C. still exist, with their organisation and administration as they were before the passing of the Air Force Act.

"The Air Force which is Not."

Our contemporary says that "when it was first suggested by a group of enthusiastically ignorant members of Parliament that a Central Air Force should be constituted . . . we objected to the proposal for the simple reason that, quite apart from the merits of the scheme as such, it was impossible to carry it into execution in time of war without infinite confusion, delay and vexation." (We rather like the term "enthusiastically ignorant" applied by the *Post*, of all journals, to a number of members of Parliament who, with all their limitations, have given the subject of aerial defence the closest attention for years past.) We have recollections of the opposition of the *Morning Post* to the Air Force Bill, but we certainly do not remember that that opposition was remarkable for anything outstandingly brilliant in

the way of reasoned argument against the contemplated change. As a matter of fact, it reminded us of nothing so much as the pathetic pleadings of a confirmed Tory newspaper to leave alone the old order of things. The argument seemed to be that whatever is is right and that everything is for the best in the best of all possible worlds.

Apparently, our contemporary, having prophesied confusion worse confounded, is a little disappointed that matters are proceeding quietly on their way, without any appearance of "confusion, delay and vexation." Confusion and vexation there certainly is none. Delay there must be. To attempt to unduly force the pace would inevitably lead to the two former, and we hold that Lord Rothermere and his technical advisers are taking the wise and statesmanlike course of allowing the change to come about gradually rather than to seek to create the new Service in a night. Unbalanced criticism like that of the *Morning Post* does not help in the task of reconstruction, but rather tends to hamper those who are doing their best under admittedly difficult circumstances. From beginning to end of the article under discussion there is not a single constructive sentence. The Government "have chosen the most critical moment of the war for the perpetration of a gigantic blunder," and the first result of it is that the *Morning Post* has become dyspeptic!

• • •

Reform in the French Air Service.

We do not appear to have a monopoly of all the trouble in our own Air Services. M. Loucheur, the French Minister of Munitions, seems to have taken occasion at an Aero Club dinner to talk to his Air Service compatriots about their proneness to criticism, and at the same time to assure them that, in the future, they would have practically all they ask. "If," he said, "you ask for 1,000 h.p. motors, you shall have them."

It is always a delicate matter to interfere in the domestic affairs of another, and the delicacy is all the greater when that other is a friendly and an allied nation. That being so, it is with the greatest diffidence that we approach the subject of the French Air Service and the reforms forecasted by the Minister of Munitions. Under ordinary circumstances we should regard it as the merest impertinence to presume to tell our neighbours they are wrong and advise them that their house requires to be put in order. But the circumstances are far from ordinary. France is our Ally in the greatest war of all time, and we thus possess a community of interests which justifies plainer speaking than would be permissible at any other time.

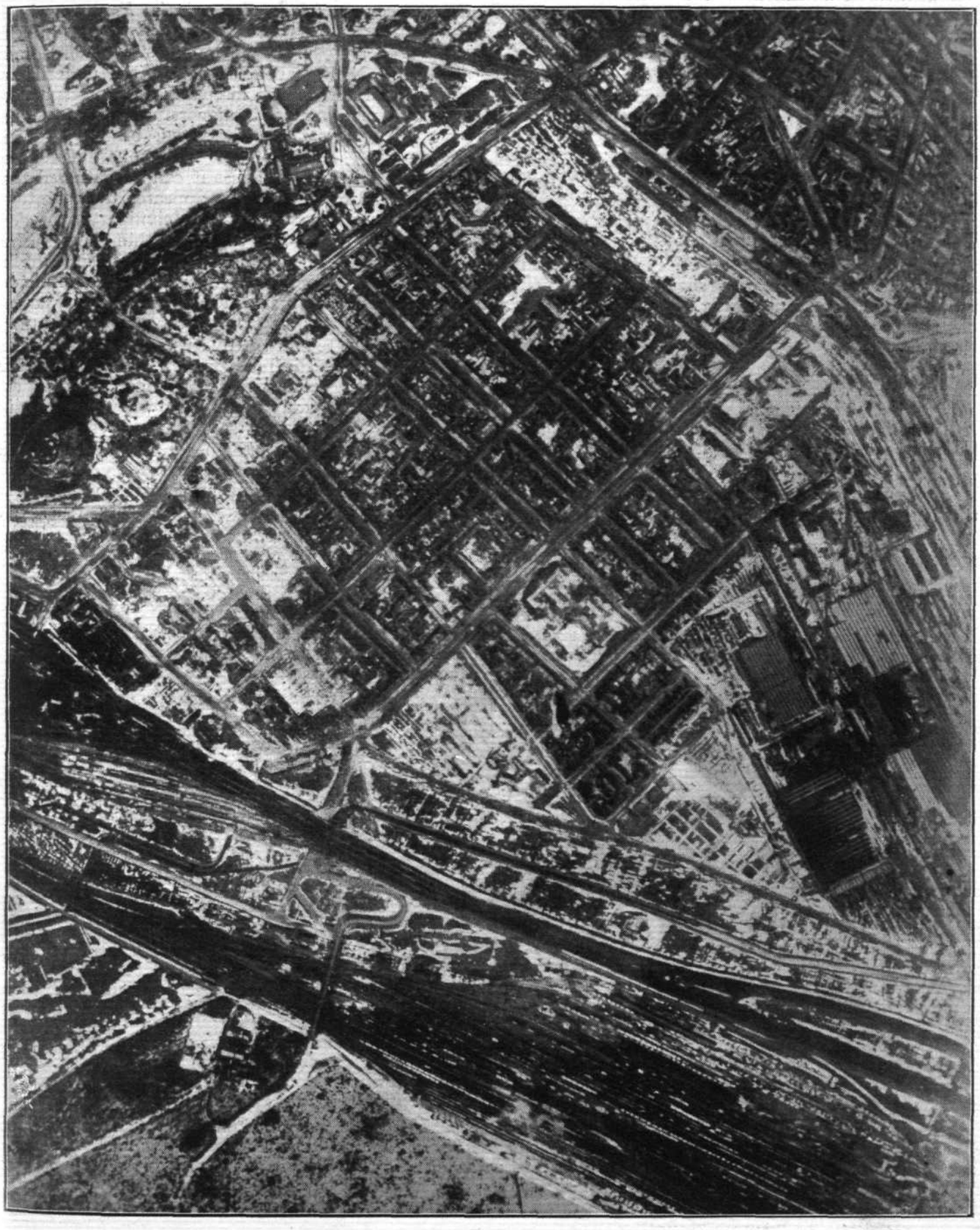
To get straight to the point, we are inclined to the view that all is not well with the French Air Service. Let us hasten to say that we do not mean its *personnel*. The French pilots and observers have proved their skill and gallantry in a thousand and more combats and reconnaissances, and they need no tribute from us to enhance their standing in the eyes of the world. The root of the whole business seems to be that the Air Service is in the same trouble that our own laboured under when the administration of of the R.A.F. could see no virtue in any machine or design that did not emanate from Farnborough. We need not go over the whole sorry story again. It is one of those episodes which, once done with, is best buried in oblivion, and we should not have revived it even in a passing reference except to point a moral. According to all the information that reaches us, the French Air Service is being compelled to work with practically little but the "A.R." machine, which is built to an official design, and, like our own old B.E. 2c machine, is hopelessly out of date and unsuited to work over the lines. The pilots complain that they are difficult to handle; that it is impossible to see from them—in action against enemy machines the pilots say they can seldom see their opponent; and that their speed at 10,000 feet is not more than 130 kiloms. per hour, compared with the 210 kiloms. of which the best German machines are capable at the same and greater altitudes. Moreover, they complain that these "A.R." machines are expected to carry out every class of work over the lines, reconnaissance, photography, artillery observation, and contact patrols. This is certainly not at all as it should be, particularly as there is no lack of designs which fulfil all the requirements of modern aerial war. To quote only two, there are the Breguet and the Spad machines, in both of which the French pilots have entire confidence, but which are sidetracked in favour of the official design. That is the case as it has been presented to us.

We have admitted already that interference in the affairs of our ally is a delicate matter, but we cannot afford to ignore these matters when they are brought to our knowledge. Our interests in this war are so bound up in the efficiency of the whole Alliance that we feel we should be doing wrong were we not to ventilate them as though they related to our own Service. Indeed, they do most intimately concern us. We are told that there is only one Allied front in the West, and if that front extends into the air—as it most certainly does—then anything that affects the efficiency of the whole is a matter of joint concern. That being so, we see no reason why weaknesses on one side should not be realised and pointed out by the other.

Once again we come on to delicate ground when we arrive at the point where constructive suggestions follow as a matter of course. It seems to us that there ought to be much closer relations between our own and the French Air Service than appear to exist. We hear a great deal about the co-ordination of war aims; the pooling of resources; and singleness of effort. There is an Allied War Council meeting at Versailles every now and then, whose business it is, presumably, to promote all-round efficiency in the conduct of the war. Surely the vital question of air power comes within the purview of that Council, and if there is a weak spot anywhere it should be pointed out and prompt and adequate measures be taken to remedy it. It would seem that all the circumstances point to the necessity for the formation of an Allied Air Council, assuming that the matters involved do not *directly* fall within the province of the War Council. At the present moment we are engaged in the reconstruction of our own Air Services so that we shall eventually have a separate and distinct Air Force. Now, we have the War Council which is charged primarily, as we understand it, with the conduct of the war on land. There is to be an Allied Naval Council, which will take charge of the co-ordination of naval operations in every theatre of the war at sea. Why not go further and constitute a similar body to co-relate the war in the air?

If that were done and the best brains of each of the Allied nations were brought to bear upon the lessons

of experience as a whole, it is unquestionable that much good would result. Apart from matters of air strategy, such a Council would have powers to consider all questions relating to types and designs of machines, and would have, also, power to enforce upon each Air Service, through its own representatives, who would be in agreement with the determined views of the whole Council, the adoption of certain types for certain work, and we should avoid the troubles that we encountered through the past policy of the R.A.F., and which now appear to be hampering the development of the French Air Service. Such a policy would have



"British Official."

AIR RAID ON KARLSRUHE ON JANUARY 14th, 1918.—Note the bomb in transit, in the centre of the picture.

most obvious advantages. From the point of view of construction it would permit of a much greater degree of standardisation of types than is attainable now, because it would at once do away with the principle of multiplicity of types which is common to the Allies, but is avoided by the enemy because of his centralisation of control. It might even be possible to bring about a single administration for the whole of the Allied Services, though that is not a matter which can be profitably discussed here and now. There is, as a matter of fact, no occasion now to go any deeper into the question than we have done. To do so might give offence—if, indeed, we have managed to keep clear of that in what we have already written.

However, in case any of our French friends should be inclined to take umbrage at anything we have said, we can only assure them that we have not written with any desire to be critical of their efforts or with the slightest intention of interfering with matters that do not concern us. Our only wish is their wish—to win the war as soon as possible. Only by securing the very maximum of efficiency all round can that be done, and it is only because of our realisation of this vital fact that we have mentioned the matter at all.

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The First-Fruits of Reprisals.

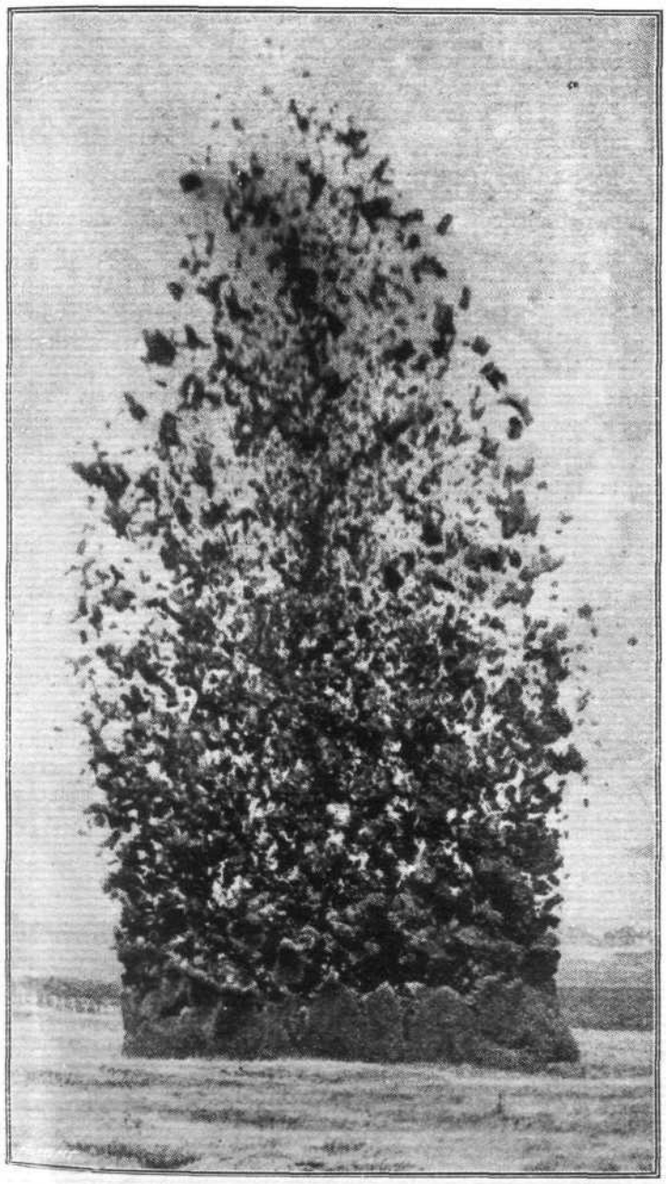
The main—in fact the only—ground upon which we have given our support to the policy of reprisals is that it would be likely to exercise a deterrent, and therefore a defensive, effect on the Hun. It was long before we could bring ourselves to advocacy of a form of war which is abhorrent to every sense of decency and civilisation, but when even one's favourite dog has gone mad there is only one thing to be done. Reprisals have been embarked upon both by ourselves and our French Allies, and so far as the information available leads us, there seems to be every reason for thinking that the results will be exactly as anticipated. According to the Geneva correspondent of the *Daily Express*, who is usually well-informed, last week's raid on Mannheim by British aeroplanes was highly successful morally as well as having achieved substantial material results. In a telegram to his paper, the correspondent says that numbers of German refugeees from Mannheim are arriving in Switzerland, bringing moving stories of the horror of a night bombardment from the air. From these stories it can be gathered that when the British squadrons appeared over the town practically the whole of the civilian population, ignoring official warnings to keep within doors, rushed into the streets in all stages of undress, and during the continuance of the raid a veritable state of pandemonium seems to have reigned. After it was all over, crowds of people paraded the streets, shouting: "Down with the war! Give us peace!" Further, it is stated that the municipality of Mannheim has sent a communication to the German Government demanding that raids on Allied open towns be discontinued. Needless to say, no answer has been made to this communication—always assuming the story to be true.

It would be dangerously misleading to accept the whole of these statements as literally true. We

"British Official."

ON THE BRITISH WESTERN FRONT.—A British scouting squadron. Aeroplanes lined up ready to fly over the enemy lines.

have seen articles in the German newspapers, written by "distinguished neutrals" purporting to describe the terrible scenes caused by the panic-stricken fear of the populace of London during German air-raids. These stories were simple fabrications—probably concocted in the offices of the journals themselves—having not the slightest foundation in fact, so that one is given to suspect the *bona-fides* of all such stories. However, in the present case the tales are not those of neutrals, "distinguished" or otherwise. They appear to have been gathered from those who actually experienced a dose of their own medicine—and did not like it. As a matter of fact, the Hun is a squealing coward who loves "frightfulness" when the other side is the victim, but hates it when applied to himself. That much we know, and it is on this trait of his character that we are reckoning in this matter of reprisals. We cannot gloat over the panic of the burghers of Mannheim. The spectacle of even German civilians rushing about half-clad about the streets on a winter night, panic-stricken by the fear of death from the skies is not a pretty thing to dwell upon, and the only thing that makes the idea at all tolerable is the fact that we did not begin or ask for the policy which causes it. We hate it, but the Hun left us no alternative, and the kindest thing in the end will be to carry on with reprisals, frequently and ruthlessly, until we get an undertaking that there will be no more raids on our open towns.



From "The Work and Training o the R.N.A.S."

BOMB-DROPPING FROM SEAPLANES.—The explosion of a bomb dropped from a height of 1,500 feet; making a crater 43 feet in diameter.

While we are on this subject of the psychology of air-raids, what is to be said of the sensation-mongering of a section of the Yellow Press which has been indulging in an orgy of horrors over the raid on London of Monday night. Because a few hundred aliens in the East End are terror-struck at the bare idea of a raid and the actual occurrence sends them into that species of unreasoning panic which causes women and children to be trampled to death the impression is being conveyed to the enemy that London is in a state of mortal terror. As a matter of fact, London is nothing of the sort. The people accept these raids as the inevitable price of war with a brutally savage enemy like the Hun, and while no one would be so foolish as to pretend that Londoners like being bombed the general attitude is one of phlegmatic indifference. That such reports as those we refer to should be published broadcast is "encouraging the enemy" if anything could encourage them. Even though they are true, the offence is no less grave, because they present an altogether wrong idea of London's mental attitude. Is there no Censor to deal with such things, and is there no power of prosecution behind the Censorship, after all? If there is it most certainly ought to be set in motion before more harm is done.

* * * *

New Member of the Air Council.

IT was announced on January 28th that the Secretary of State for the Air Force has appointed the Right Hon. Sir Henry Norman, Bt., M.P., to be an additional member of the Air Council."

Medal for Brave Nurse.

IT was announced on Jan. 30th that the King has been pleased to approve of the award of the Military Medal to the following lady for bravery and devotion to duty on the occasion of a hostile air raid on a casualty clearing station. Although wounded, she continued to give directions for the care of the wounded :—

Sister Eileen King, Q.A.I.M.N.S. (R.).

Another Aeroplane from Malaya.

AN additional sum of £2,250 has been collected in the Malay Peninsula for the purchase of an aeroplane to be presented, through the Colonial Office, to the R.F.C., which will be named "Malaya 35, the Chinese Loyalty."

The Bombing of Zierikzee.

THE Dutch Foreign Office announces that Great Britain has paid to the Netherlands 92,976 guilders (£7,748) as partial compensation for the damage done at Zierikzee on the night of April 29th by bombs dropped from a British aeroplane. This sum covers the material damage. A further communication is expected from the British Government respecting the indirect damage, which is estimated by Dutch experts at £2,252.

American Honour for Captain Bishop.

THE Foreign Service Committee of the Aero Club of America has awarded its special war medal to Capt. William Avery Bishop, of the Canadian Army and the R.F.C., who is credited with bringing down 43 enemy machines.

To Readers—One and All.

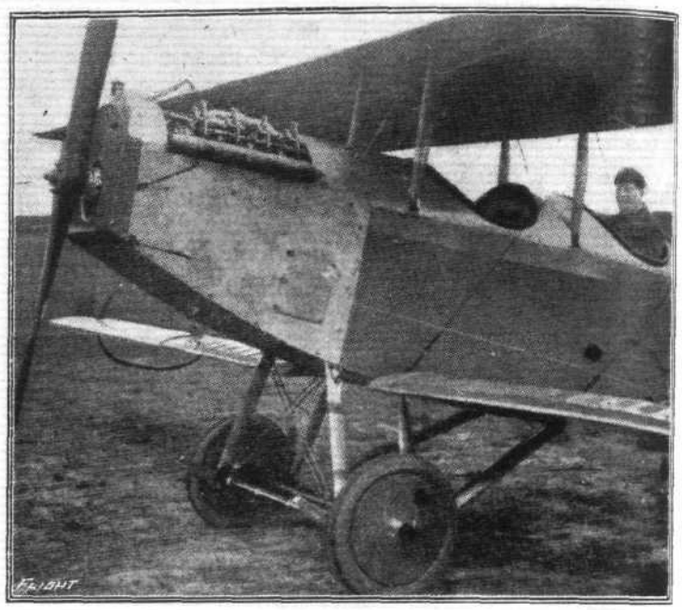
THE Editor of "FLIGHT" will at all times be pleased to consider original articles (illustrated or otherwise) on subjects directly or indirectly allied with aviation. All articles accepted will be paid for; a high literary standard of writing is not essential; it is the facts which matter. Practical explanatory articles are most acceptable. Diagrams and similar illustrations need only be rough sketches if necessary.

THE UNITED EASTERN TRACTOR BIPLANE.

DURING the latter part of 1917, the United Eastern Aeroplane Corporation of Brooklyn, N.Y., U.S.A., turned out several very successful training tractor biplanes, a description of which, together with illustrations and scale drawings, we give herewith. The Eastern tractor has been designed strictly to Government specifications, and is, we are informed, specially noteworthy as regards workmanship and finish.

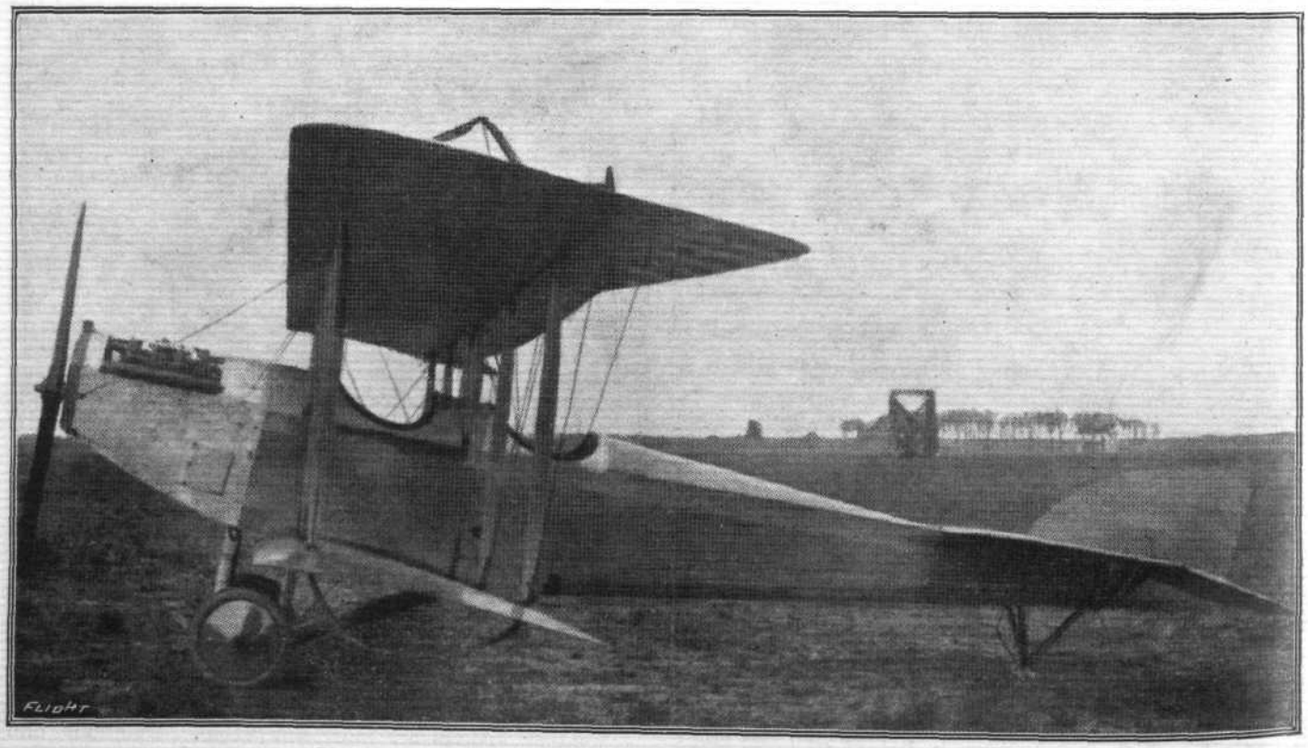
The main planes are built up in five sections, two being attached to a smaller central section or panel, supported above the *fuselage* by four struts, comprising the top surface, and two attached direct to the *fuselage*, forming the lower surface. Eiffel No. 36 wing-section has been selected on account of the high L/D ratio, giving quick climb and high loading at comparatively slow speed. The planes are given a dihedral angle of 1° and the top plane is staggered forward about 4 ins. The normal angle of incidence is about 3°. The planes are built up in the conventional manner of spruce, spars and ribs of the lightest possible section. Two pairs of streamlined struts separate top and bottom planes on each side of the *fuselage*. The bracing is of Roebling steel cable doubled in the centre sections. Drift wires are taken from the forward ends of the upper *fuselage longerons* to the top of the front inner interplane struts, and from the forward ends of the lower *longerons* to the lower ends of the same interplane struts. The outer portions of the top plane extending beyond the interplane struts are braced from kingposts above these struts. Lateral control is obtained by means of a pair of interconnected *ailerons*, each 16 sq. ft. area, hinged to the top plane rear spar. The chord of these *ailerons* increases towards the tips, where the trailing edge is given a slight up-turn.

The horizontal stabilising plane, 36 sq. ft. area, is of one piece construction, with raked ends and rounded corners. It is of the flat cambered, non-lifting type, and is mounted on the top *longerons* of the *fuselage*. The elevator is divided into two flaps, with the rudder working in between, and is constructed of steel tubing with wood ribs. The rudder, which is of distinctive shape, is partly balanced by a small surface forward of the pivoting post, and has an area of 15 sq. ft. The controlling surfaces are operated by standard dual stick and rudder-bar control.

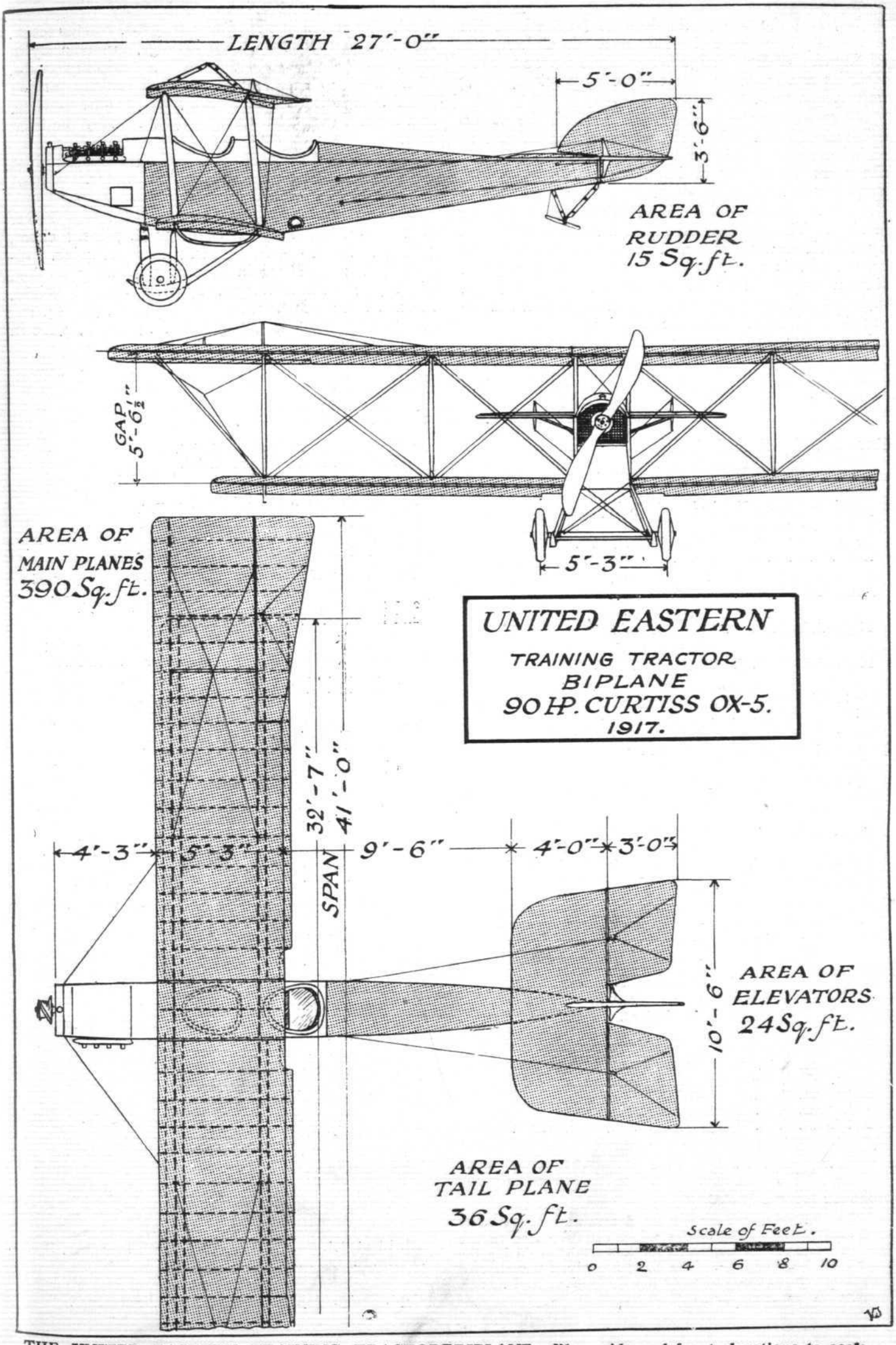


The fore part of the United Eastern training tractor biplane, showing the 90 h.p. Curtiss engine and the landing chassis.

The *fuselage* is of standard construction; wooden members and metal fittings, braced with piano wire and Roebling cable, doubled at the forward section. It is built up in two sections, being joined immediately behind the rear cockpit. It is rectangular in section, tapering to a vertical knife-edge at the rear, having a maximum width and depth of 2 ft. 3 ins. and 3 ft., respectively. The forward portion, enclosing the



Side view of the United Eastern training tractor biplane.



THE UNITED EASTERN TRAINING TRACTOR BIPLANE.—Plan, side and front elevations to scale.

engine, and the top turtle deck as far back as the rear cockpit is covered with sheet aluminium, the remainder of the *fuselage* being fabric covered. The cockpits are made as comfortable as possible, being well upholstered.

A two-wheel type landing gear is fitted, the wheels being 26 × 4 ins. The axle, which is of 1¾ in. chrome nickel steel, is mounted by means of rubber shock absorbers on a pair of laminated ash hockey-club shaped skids. A vertical strut both fore and aft of the axle on each skid connect the latter with the *fuselage*. The two forward chassis struts are connected by a horizontal tie rod, and the chassis is cross wire braced at this point. The wheel track is 5 ft. 3 ins. Rattan hoop-skids are mounted on the lower wing tips, iust below the outer interplane struts, and a swivel-jng skid is located under the tail.

The power plant consists of a Curtiss 90 h.p. OX-5 8-cyl. V, coupled direct to an 8 ft. 3 ins. tractor screw. Mounted in the nose of the *fuselage*, immediately in front of the engine, is the radiator weighing 55 lbs. There are two petrol tanks, a small gravity tank of 5 gals. capacity located under the engine cowling, and a main tank containing 30 galls. under the front seat.

The gravity tank is fed by pressure obtained from an air pump worked by the motor. A hand pump is also provided.

The principal characteristics of the Eastern tractor are :—span, upper 41 ft., lower 32 ft. 7 ins. ; chord, 5 ft. 3 ins. ; gap 5 ft. 6½ ins. ; stagger, 4 ins. ; dihedral, 1° ; angle of incidence, 3° ; wing section, Eiffel 36 ; overall length, 27 ft. ; overall height, 10 ft. 6 ins. ; total area of main planes, 390 sq. ft. ; speed range (full load), 40-75 m.p.h. ; climb, 4,000 ft. in 10 mins. ; gliding angle, 1 in 7.

THE ROLL OF HONOUR.

REPORTED by the Admiralty :—

Accidentally Killed.

Flight Lieut. C. E. Burden, R.N.
Prob. Flight Officer H. T. Coo, R.N.
Prob. Flight Officer W. F. Floyd, R.N.
Prob. Flight Officer L. G. Huddleston, R.N.
Prob. Flight Officer H. C. Langstone, R.N.
Lieut. K. F. A. Wallis, R.N.

Died of Injuries.

Acting Flight Commander C. Murray, R.N.

Missing (feared Killed).

Flight Sub-Lieut. W. Johnston, R.N.

Wounded.

Flight Sub-Lieut. J. E. Beveridge, R.N.

Accidentally Injured.

Prob. Flight Officer H. Bricker, R.N.
Flight Sub-Lieut. A. A. Cameron, R.N.
Prob. Flight Officer E. C. Chesterton, R.N.

Reported by the War Office :—

Killed.

2nd Lieut. A. S. Balfour, R.F.A., attd. R.F.C.

Previously Missing, now reported Killed.

2nd Lieut. H. T. Batson, R. W. Surrey R., attd. R.F.C.
Capt. W. A. Fleming, M.C., Devon., attd. R.F.C.
2nd Lieut. D. R. Hinckley, Y. and L., attd. R.F.C.
2nd Lieut. C. Pickstone, R.F.C.
27234 Acting Sergt. W. S. Wickham, R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in German hands.

2nd Lieut. W. G. Morgan, R.F.C.

Died.

79074 1st Air-Mech. J. Barnes, R.F.C.
7987 1st Air-Mech. J. A. Billingham, R.F.C.
97229 Air-Mech, T. A. Hodgson, R.F.C.
79541 2nd Air-Mech. H. J. Watford, R.F.C.

Wounded.

Capt. R. W. Chappell, R.F.C.
2nd Lieut. J. E. Cross, Manch., attd. R.F.C.
Lieut. W. R. Haggas, L.N.Lan. R., attd. R.F.C.
2nd Lieut. F. H. Hall, R.F.C.
2nd Lieut. J. H. Hartley, R.F.C.
2nd Lieut. J. H. Haughan, Bord. R., attd. R.F.C.
2nd Lieut. L. B. Hoyland, R.F.C.
2nd Lieut. R. McPherson, R.F.C.
Lieut. B. G. Nichols, R.F.A., attd. R.F.C.
2nd Lieut. I. L. Roy, R.F.C.
50153 1st Air-Mech. J. Crowther, R.F.C.
53010 2nd Air-Mech W. C. King, R.F.C.
102855 2nd Air-Mech, J. E. McKay, R.F.C.
66249 2nd Air-Mech H. J. Thomas, R.F.C.

Previously Wounded and Missing, now reported Wounded and Prisoners in German hands.

2nd Lieut. W. Kember, Lancs. F., attd. R.F.C.
2nd Lieut. E. A. L. F. Smith, R.F.C.

Previously reported Prisoners, now reported Wounded and Prisoners in German hands.

2nd Lieut. B. F. Braithwaite, R.F.C.
2nd Lieut. R. A. Cartledge, R.F.C.

Missing.

2nd Lieut. H. V. Biddington, R.F.C.
Lieut. J. Boyd, Sco. Rif., attd. R.F.C.
2nd Lieut. J. H. Corbet, Shrops. L.I., attd. R.F.C.
2nd Lieut. H. E. Davies, R.F.C.
Lieut. G. N. Goldie, R.F.C.
Lieut. A. S. Mills, Yeo., attd. R.F.C.
2nd Lieut. D. W. Ross, R.F.C.
2nd Lieut, W. Taylor, E. Lancs. R., attd. R.F.C.
2nd Lieut. H. A. Tracey, S. Wales Bord., attd. R.F.C.
2nd Lieut. T. A. Unwin, R.F.C.
2nd Lieut. J. H. Young, Lond. R., attd. R.F.C.

Previously Missing, now reported Prisoners in German hands.

2nd Lieut. C. H. Brown, R.F.C.
Lieut. F. R. C. Cobbold, R.F.C.
2nd Lieut. R. G. Frith, R.F.C.
2nd Lieut. S. Kendall, R.F.C.
2nd Lieut. A. L. Kidd, R.F.C.
Lieut. J. M. Leach, Yorks., attd. R.F.C.
Pieut. W. G. Meggitt, M.C., Welsh, attd. R.F.C.
2nd Lieut. D. Miller, R.F.C.
2nd Lieut. C. E. Ogden, R.F.C.
2nd Lieut. A. W. Palmer, R.F.C.
2nd Lieut. H. G. Robinson. R.F.C.
2nd Lieut. H. A. Yeo, R.F.C.

Prisoner of War in German hands.

7281 2nd Air-Mech. P. Conlin, R.F.C.

Honours for the R.F.C.

THE following are among the decorations and medals conferred by the King of Serbia at various dates to the British forces for distinguished services rendered during the course of the campaign. The King has given unrestricted permission in all cases to wear the decorations and medals in question :—

ORDER OF THE WHITE EAGLE.

4th Class (with Swords)

Bt. Lieut-Col. (temp. Lieut.-Col.) G. W. P. Dawes, D.S.O., R. Berks. R., and R.F.C.

4th Class.

Capt. (temp. Maj.) A. Cleghorn, R.E., and R.F.C.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Presentation to the Club.

MESSRS. BURROUGHES AND WATTS have very kindly presented to the Club one of their best quality Billiard Tables in oak, fitted with their celebrated Patent Steel vacuum cushions.

THE FLYING SERVICES FUND, administered by THE ROYAL AERO CLUB.

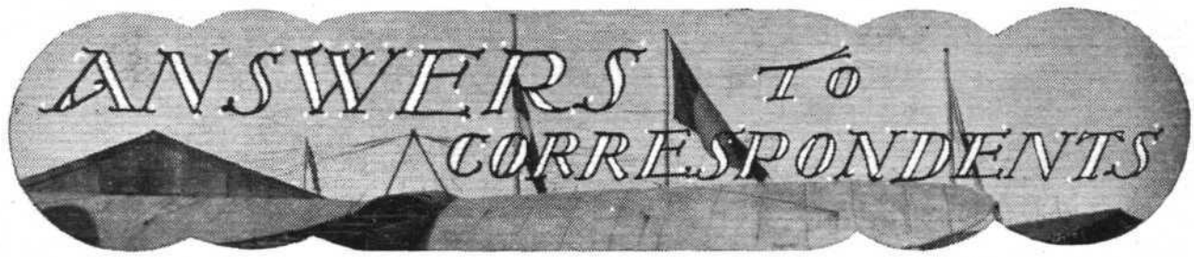
THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W. 1.

Subscriptions.	£	s.	d.
Total subscriptions received to Jan. 22nd, 1918	12,538	8	2
Staff and Workers of Gwynnes, Ltd. (fifty-fifth contribution)	10	11	11
Total, January 29th, 1918	12,549	0	1

H. E. PERRIN, Secretary.
3, Clifford Street, New Bond Street, W. 1.



[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—ED.]

W. R. H. D. (N.Z. Engineers).—The static thrust of an air screw is no criterion on which to judge the thrust obtainable with a given engine. It is quite conceivable that a screw which gives a high static thrust will give a small thrust when mounted on a machine travelling through the air, and similarly an air screw may be very efficient in flight but give a fairly low static thrust. This is, however, a question which space does not allow of discussing in these columns. From the formula

$$T = \frac{550 \times HP. \times E_p}{V}$$

it will be seen that if the efficiency of the propeller remains the same, the thrust obtainable with a given engine depends only on the translational speed. Thus, if on a certain machine fitted with this engine the thrust is found to be T lbs. at a speed of v ft. per sec., if the efficiency of the new air screw is the same as that of the old, the thrust on another machine built for a speed of $2v$ ft. per sec. will be only T : 2. To give a numerical example : Suppose your engine develops 50 h.p. and is installed in an aeroplane which flies at 80 ft. per sec., and that at that speed the propeller efficiency is ·70. The thrust T will then equal

$$\frac{550 \times 50 \times \cdot 70}{80} = 240 \cdot 6 \text{ lbs.}$$

Now suppose that the same engine is put into another machine designed to fly at 160 ft. per sec., and that the propeller for this speed also gives an efficiency of 70 per cent. The thrust will then be

$$T = \frac{550 \times 50 \times \cdot 70}{160} = 120 \cdot 3 \text{ lbs.},$$

or just half of the thrust delivered in the slower machine.

W. S. (R.G.A.).—The machine in the illustration you refer to is a BE2C. The twin-engine machine in the Gallay radiator advertisement is a Dyott biplane, flown at Hendon in 1915. We believe that Gamages stock compressed-air motors suitable for model aeroplanes,

G. E. P. (Boston).—The meaning of the letters BE, RE, FE, and SE has already been explained in these columns, but for the benefit of our many new readers it may be repeated here. The letters BE were adopted in the first place to signify Bleriot Experimental, as the machines of this type were fitted with tractor screws. In the same manner FE represents Farman Experimental, the "pusher" type with engine behind. RE indicates Reconnoitring Experimental, and SE Scouting Experimental. The formula $0.4d^2N$ is no longer any criterion of the power output of an aero engine, since with the improved efficiency now obtained all engines develop considerably more power than that indicated by above formula. In his book on aero engines Mr. G. A. Burls suggests that approximately correct results may be obtained by altering the formula to $0.6d^2N$, or 50 per cent. more than the power given by the R.A.C. formula. For an engine of so low power as 40 h.p. there would probably be no gain attending the employment of two air screws instead of one, as any gain there might be in the efficiency would probably be counteracted by the loss in the transmission gear necessary when two screws were employed. No definite answer can be given to the question of the type of sockets employed for inter-plane struts of the "I" type, as the various makers use different methods. A detailed description with scale drawings of the Avro triplane was published in our issue of April 1st, 1911, a copy of which can be obtained from the offices of "FLIGHT"; the price is 1s. 6d. post free. The roll shown in your diagrams has been done on Nieuport scouts, and is, we believe, known as the "apple turn-over."

H. J. U. (Surrey).—The red, white, and blue stripes on aeroplanes are identification marks. We should not like to say this machine is the fastest in the world, although it is certainly very fast; no figures relating to its may, however, be published. The Sopwith "Camel" has not, as you appear to think, its top plane sloping down; on the contrary, the top plane is straight and the bottom plane is set at a dihedral angle or sloping up. Under certain conditions a four-bladed propeller may be more efficient than a two-bladed, especially for transmitting high power, as the employment of four blades allows of keeping the diameter somewhat smaller.

G. A. (Hampstead).—Generally speaking the BE2E and the RE8 are a good deal alike. Apart from the engine, however, there are minor differences. For instance, the placing of the wings is farther back on the RE8 than on the BE2E owing to the longer engine. The tail also is somewhat different, and the seat back of the RE8 is placed farther back than the back seat of the BE2E. For identification purposes the deH2 and the FE8 can best be distinguished by the formation of the tail booms. In the former the tail booms are of similar formation to those of the Henry Farman, while in the FE8 they are parallel in plan but converge to a point at the tail when seen from the side. We have not published any large scale drawings of a Curtiss "Wireless."

F. E. T. (St. Albans).—See reply to G. E. P. (Boston).

AIRSCREW ANALYSIS.

By A. F. ZAHM.

(*Concluded from page 99.*)

Laws of comparison.—The air force on a small element of a propeller may be written—

$$R = \rho A V^2 f^1(i),$$

in which A is the element's area, i its incidence. For an air-screw of fixed shape having a forward velocity V, if i

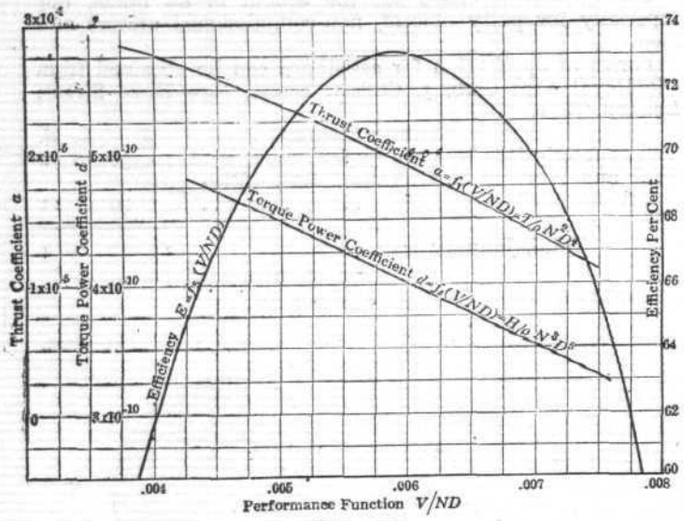


Fig. 10.

remains constant while the diameter D, and angular speed N, vary,

$$R = \rho N^2 D^4 f(V/ND),$$

since $A \propto D^2$, $V \propto ND$, and i is a function of V/ND. Since the axial and peripheral components of R are similarly expressed, their summation, or the whole thrust and torque may be written

$$\text{Thrust, } T = \rho N^2 D^4 f_1(V/ND) \quad (7)$$
$$\text{Torque, } Q = \rho N^2 D^5 f_2(V/ND) \quad (8)$$

From these follow at once—

$$\text{Thrust power} = TV = \rho N^3 D^5 f_3(V/ND) \quad (9)$$
$$\text{Torque power} = 2\pi QN = \rho N^3 D^5 f_4(V/ND) \quad (10)$$
$$\text{Efficiency} = TV/2\pi QN = f_5(V/ND) \quad (11)$$

These five equations furnish useful laws of comparison between geometrically similar propellers. For example, if two such screws move at any chosen V/ND in media whose densities are respectively ρ and ρ_1, their thrusts are thus related :—

$$T/T_1 = \rho N^2 D^4/\rho_1 N^2_1 D^4_1$$
$$\therefore T = a_1 \rho N^2 D^4,$$
$$\text{where } a_1 = T_1/\rho_1 N^2_1 D^4_1 = f_1(V/ND)$$

If therefore a_1 be observed, or given, for one screw of diameter D_1, the thrust T, of any other, of diameter D, moving with the same V/ND, is found by simple multiplication. Similarly for the torque, &c. Thus it appears that the propeller map here treated furnishes directly the characteristics of a particular airscrew, and, by comparison, those of geometrically similar screws.

Map of propeller coefficients.—Assuming V/ND constant, equations (7), (8), (9), (10) and (11) may be written :—

$$\text{Thrust} = a\rho N^2 D^4 \quad (7')$$
$$\text{Torque} = b\rho N^2 D^5 \quad (8')$$
$$\text{Thrust power} = c\rho N^3 D^5 \quad (9')$$
$$\text{Torque power} = d\rho N^3 D^5 \quad (10')$$
$$\text{Efficiency} = E = \text{const.} \quad (11')$$

in which a, b, c and d are constants for the given value of V/ND, and are called respectively "thrust coefficient," "torque coefficient," &c. Since as above seen each of these four coefficients is a function of V/ND, it is common practice to plot two of them against V/ND, as in Fig. 10. The corresponding propeller characteristic is then found for any value of V/ND, by taking the appropriate coefficient from the diagram and substituting in the proper equation above. For example, if $a = \rho f_1(V/ND)$, and $d = \rho f_4(V/ND)$ be taken from the diagram and substituted in (7') and (10') respectively, they give the thrust and the torque power. From these two characteristics the other three follow as already explained.

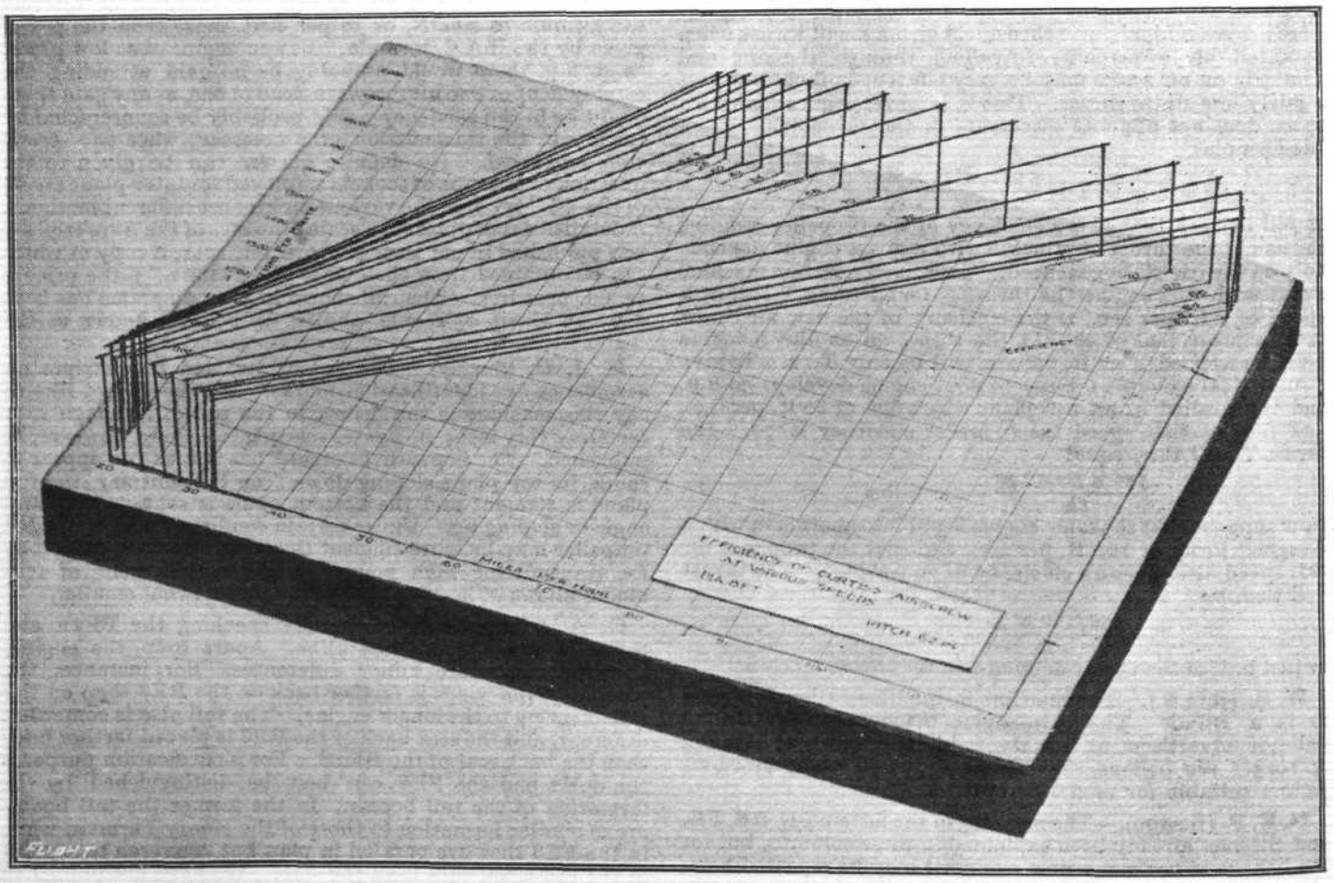


Fig. 11.

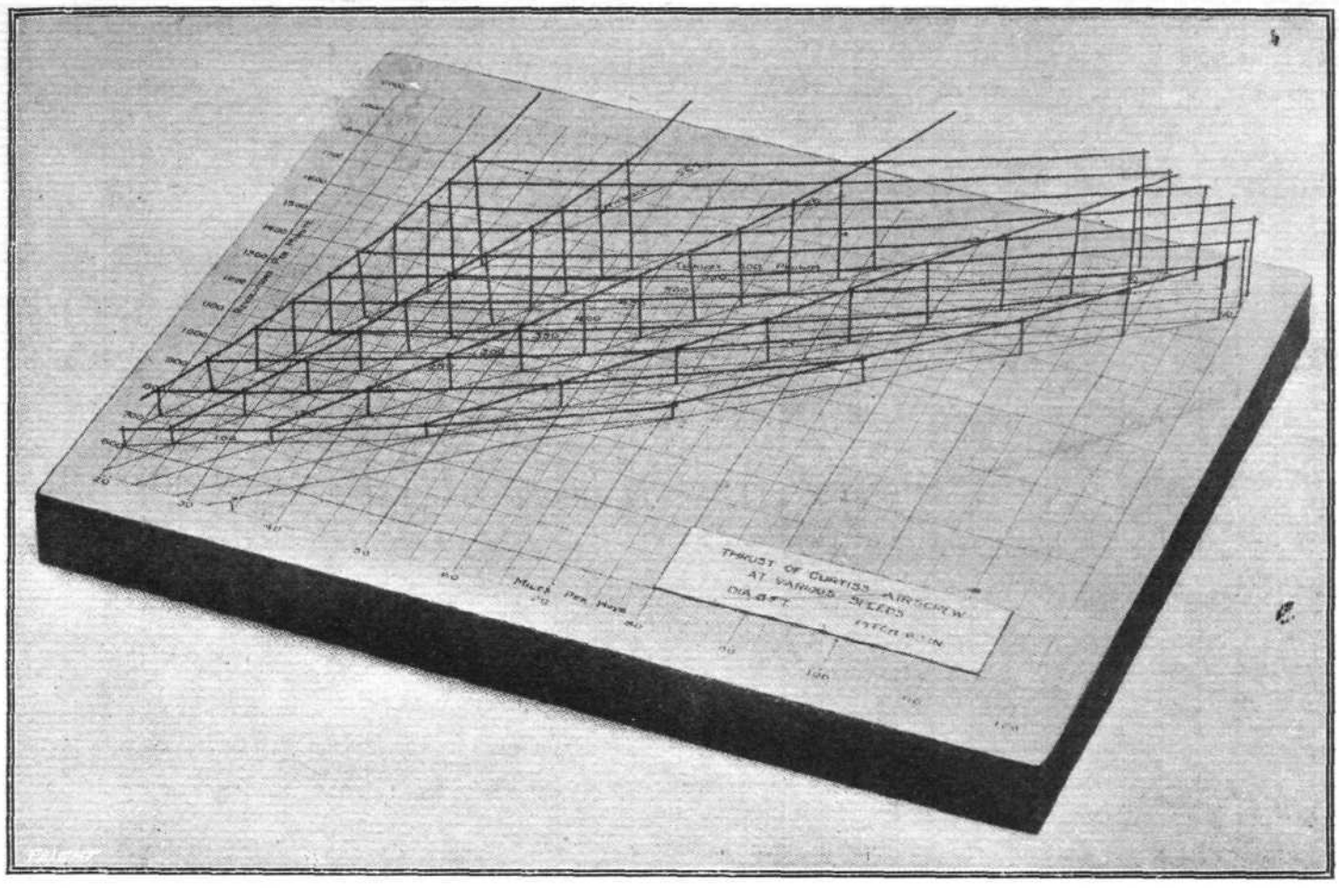


Fig. 12.

Comparison of maps.—Thus, from a map of propeller coefficients one finds by computation values which can be read directly from a map of propeller characteristics. The latter map is more expensive when seldom used ; more economical when frequently used for hurried reference. Given either map the other can be produced from it through equations* 7′, 8′, 9′, 10′.

Relief map of propeller characteristics.—The efficiency and thrust values given in Fig. 6 are plotted in relief in Figs. 11 and 12 respectively. The efficiency surface—a species of cylindroid—has for equation $E = f'_5(V/N)$, and is generated by a right line rotating about the Z-axis, while oscillating along and perpendicular to it.† The thrust surface has for equation $T = N^2 f_1 (V/N)$, and is generated by a parabola co-axial with Z and rotating about it with varying parameter. Similarly for the torque surface $Q = N^2 f'_2(V/N)$. The power surfaces are obviously generated by cubic parabolas rotating about Z with altering parameters. Viewed otherwise, the plane V/N = constant contains those generators of the characteristic surfaces and carries them with it while rotating about Z with varying parameter ; the parabolas expanding and contracting ; the straight line sliding to and fro along Z ; and all their projections coinciding with the efficiency line or trace of the rotating plane on the reference plane VN.

If the form of any two of these functions, say $f'_1(V/N)$, $f'_2(V/N)$, were known, the equations to all the five surfaces could be written at once, thus furnishing complete mathematical expressions for the five propeller characteristics. Such functions can be derived analytically when adequate formulæ in terms of V and N are found to L and D, and the velocity and incidence of the air flow at each section of the propeller blade.

The efficiency lines in Fig. 6 are obviously projections of the intersections of the efficiency surface made by planes normal to Z and cutting it at distances from the origin equal to 56, 58, 60, &c., up to 73. Similarly the thrust lines are projections of intersections of the thrust surface made by planes normal to Z and cutting it at distances 100, 150, &c. Similarly for the power curves.

*From these equations it is seen that for ρ, D, V/ND, constant the thrust and torque vary as N^2, the thrust power and torque power vary as N^3, and the efficiency is a constant function of V/N. Hence if these five characteristics be known for one ratio of V/N they are determinate for all values of V, N, having that ratio. Thus all the curves of thrust shown in Fig. 6 are derived from a single one by the relation $T \propto N^2$. Similarly for the curves of torque, thrust power and torque power. The efficiency graphs are obviously all straight lines through the origin of V and N.

†The Z-axis is here assumed normal to the paper and co-ordinate with the V and N axes.

Stress Analysis.

Scope.—The stresses in an air-screw may be due—(*a*) to constant velocities of rotation and translation, or (*b*) to variations in one or both.

In *steady rectilinear flight* an air-screw with straight blades—the only form here treated—is subject to two kinds of loading : (1) centrifugal, which begets in the blades purely tensile stress ; (2) aerodynamic, which begets bending stress.

To these must be added for *unsteady flight* inertia loads due to three kinds of change of motion : (1) translatory acceleration ; (2) rotatory acceleration ; (3) precession or nutation.

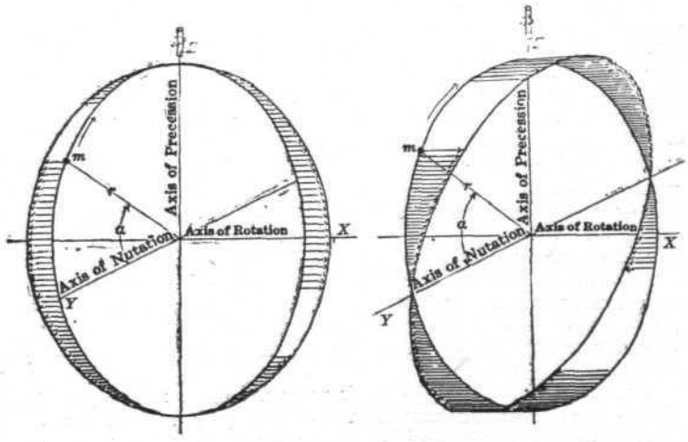


Fig. 13.

The aerodynamic effects of such velocity changes are slight and not treated here.

(*a*) *Stresses in steady flight.*—For steady rectilinear flight we may first find the centrifugal, then the bending stress, then by superposition find their resultant.

Centrifugal stress.—The centrifugal force F, at any cross-section of a blade, is found by the formula $F = Mv^2/r$, v being the peripheral speed, r the distance, of the centre of mass M of the blade segment tending to fly outward from the section in question. Usually this outward segment is mentally cut into smaller segments, whose mass and peripheral speed are first computed then substituted in the given formula

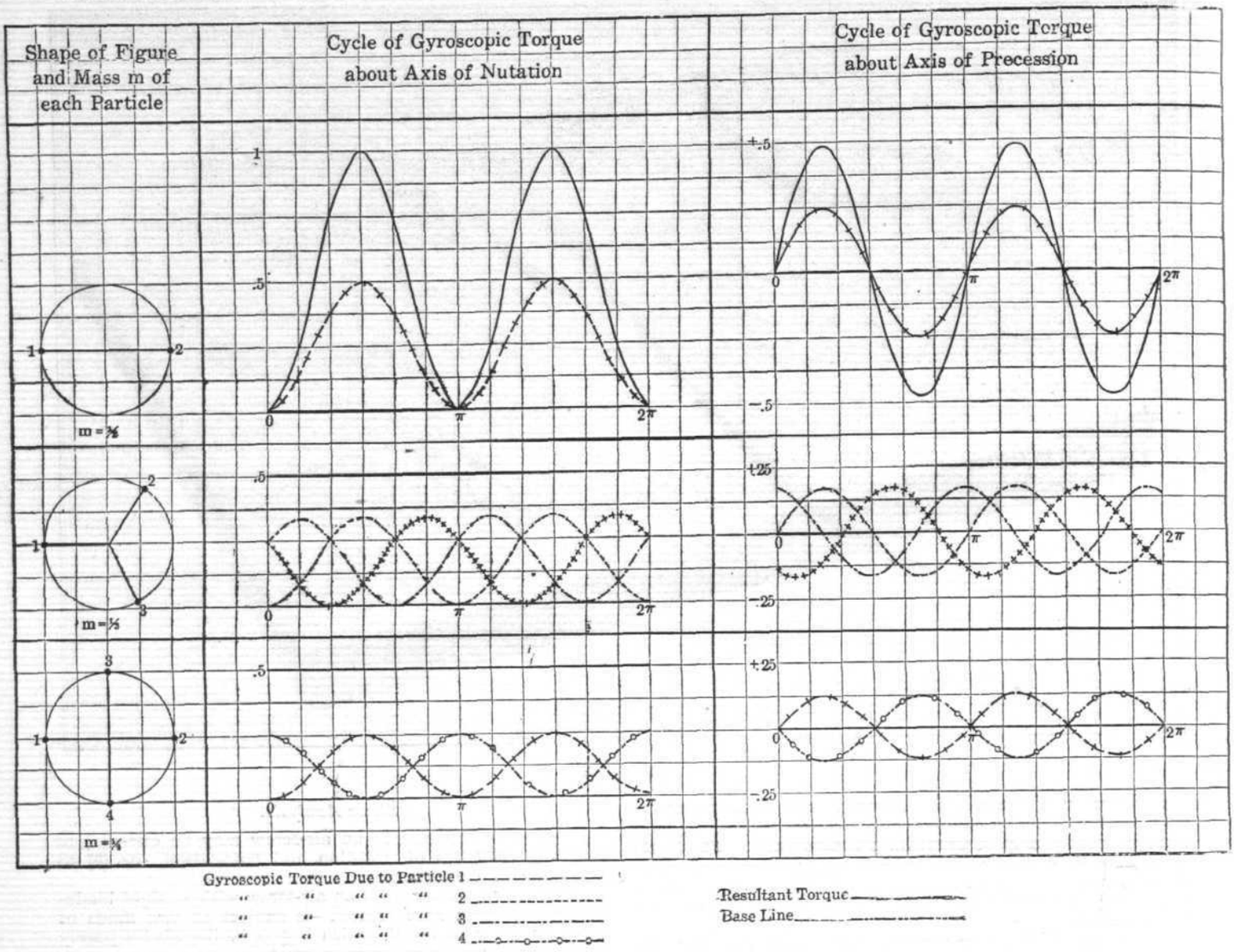


Fig. 14.

$F = \Sigma mv^2/r$. Dividing F by the section area now gives the average centrifugal stress.

Bending stresses.—The bending moment M, at any section of a straight radial blade, is computed by the formula $M = \Sigma fl$, where f, taken normal to the plane of the neutral surface at the section, is the component of the air force on any small block of the outer segment of the blade, l its distance from the section. Dividing M by the section modulus gives the bending stress in the outer fibre at the section.

Resultant stress and safety factor.—The bending stress is plus or minus. The centrifugal is plus ; the maximum is the greatest sum of the positive or tensile stresses. Dividing this sum into the tensile strength of the material gives the factor of safety.

Diagram of stresses and of safety factor.—Fig. 5 portrays graphically the foregoing stresses and factor of safety for all parts of a blade except the tip where they die away, and the root where they are negligible if the hub be properly designed.

Grouping of data and analytic results.—Figs. 1 to 6 present in systematic order the data and analytic results for an entire aerodynamic and stress analysis of a propeller at both high and low speeds of steady flight. The basic data are given in Figs. 1 and 2 ; the analytic results are given for low speed and for high speed in Figs. 3, 4 and 5. The propeller map, showing the thrust, power and efficiency at various speeds, is reproduced in Fig. 6, and is the aggregate result of a complete aerodynamic analysis for a graded set of speeds of translation and rotation.

(*b*) *Load increments due to unsteadiness of flight.*—The added stresses due to unsteadiness of flight are usually smaller than those just treated, but require pas ing notice.

Translatory acceleration loads.—If the screw receives a translatory acceleration j, every particle m opposes this with a force mj, which in practice is negligibly small.

Rotatory acceleration loads.—If the screw receives an acceleration $\propto$ about its axis, every particle m opposes this with an inertia force $mr\propto$, or an axial torque $mr^2\propto$, where r is the radial distance of m. Hence the axial torque offered by any blade segment against rotatory acceleration is

$$Q = \Sigma m r^2 \propto \qquad (12)$$

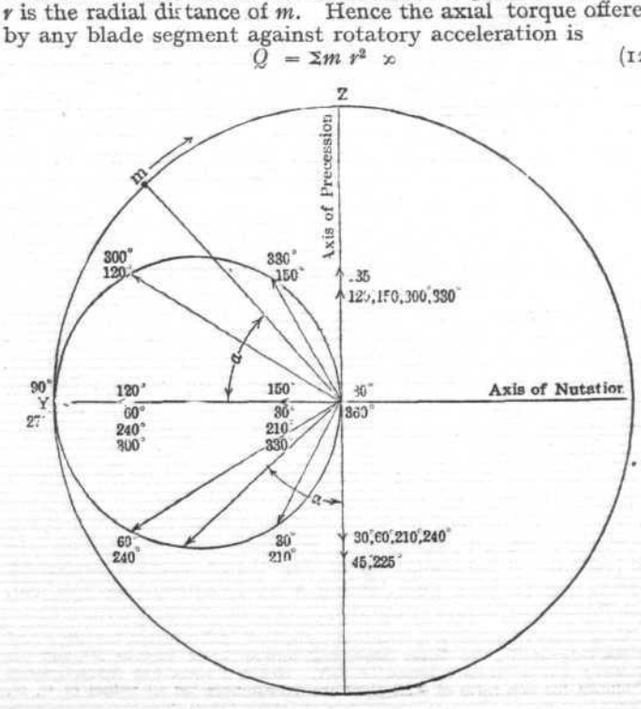


Fig. 15.

integrated throughout the segment and from this value the moment at any blade section, due to the mass of said segment, can be found by elementary statics.

The inertia torque for the whole blade, that is,

$$Q = \Sigma\,(mr^2 \propto)\,\dot{R} = I \propto \qquad (13)$$

where I is the axial moment of inertia, equals the engine torque less the air resistance to rotation. If the screw runs at full speed, first at no throttle, then at full throttle, the opposing blade torque changes from a small negative to full positive value.

*Gyroscopic loads.**—To express the gyroscopic resistance to pitching and yawing, assume fixed centroidal axes X, Y and Z, through the air-screw parallel to the conventional axes of the air-plane, X being the longitudinal axis of the latter; and let ω and Ω be the angular speeds of rotation and of yaw without pitching. Then any particle m at xyz has parallel to X the linear speed $y\ \Omega$, and the linear acceleration $z\ \omega\ \Omega$, as shown graphically in Fig. 13. Multiplying this acceleration by m gives the force

$$f = mz\,\omega\Omega \qquad (14)$$

which varies at quadrant intervals through the values of $m, r\,\omega\,\Omega$, o, and $-m\,r\,\omega\,\Omega$. This force exerts about Y and Z respectively the torques

$$q_y = mz^2\omega\Omega \qquad (15)$$

$$q_z = -myz\omega\Omega \qquad (16)$$

which also vary cyclically, as illustrated in Fig. 14, and, together with their resultant, in Fig. 15. Similar effects ensue from pitching without yaw.

The above expressions and the figures illustrating them, show that for yaw without pitch the gyroscopic force on m is always parallel to X, and reverses twice each revolution; that its torque about Y is always positive and fluctuates from zero to a maximum $m\ r^2\ \omega\ \Omega$, twice each revolution; that its torque about Z oscillates from $m\,r^2\,\omega\,\Omega/2$ to $-m\,r\,\omega\,\Omega/2$ twice each revolution; that the resultant torque is a maximum, $m\,r^2\,\omega\,\Omega$, when the particle is crossing the XZ plane. Similar conclusions are obvious for pitch without yaw.

The entire gyroscopic force on any blade segment is parallel to X, and, when at its maximum value, is very closely

$$F = \Sigma\, mr\omega\Omega\dagger = M\bar{r}\omega\Omega \qquad (17)$$

in which M is the mass of the segment, $\bar{r}$ the radial distance of its centroid. This force is at a distance $r_1 = r^2_2/\bar{r}$ from X where r_2 is the radius of inertia of the segment referred to X.

The maximum gyroscopic torque about Y for yawing without pitch is, for any blade segment, $\Sigma\, m\, z^2\, \omega\ \Omega$, integrated throughout the segment; and for a whole screw is

$$Q = I\,\omega\Omega \qquad (18)$$

in which I is the moment of inertia referred to X of the entire screw. The gyroscopic torque of the whole screw or any segment is found for any position $\propto$, Fig. 13, by multiplying the maximum by $\sin^2\propto$.

Since the entire gyroscopic force on a blade fluctuates like that of a particle, the moment about Y ranges from zero to $I\,\omega\,\Omega$, about Z from $I\,\omega\,\Omega/2$ to $-I\,\omega\,\Omega/2$, twice each revolution. The equivalent gyroscopic stress may therefore be computed as for a repetitive load ranging many times per second from zero to $I\,\omega\,\Omega$.

* For a fuller treatment see the writer's *Periodic Stresses in Gyroscopic Bodies with Application to Airscrews*, Report of National Advisory Committee for Aeronautics, 1917.

† Owing to the width and thickness of the blade this expression is in slight error—less than one part in 5,000 for ordinary blades.

Fatal Accidents.

Probation. Flight Officer W. E. Floyd, R.N.A.S., was killed on January 22nd as the result of his machine catching fire whilst flying at an Essex aerodrome.

WHILE flying near Rugby on the afternoon of January 22nd, 2nd Lieut. H. G. Nelson was killed through falling from his machine at a height of 3,000 ft. He was flying alone, and it is supposed that in some inexplicable way the belt attaching him to the machine came unfastened. The aeroplane continued its flight and came down a few fields away.

Lieut. Brendel, while flying over the Mersey on January 27th, fell into the river and was drowned.

Revised Rates of Pay for R.F.C. Officers.

IN the Royal Warrant setting forth the pay of officers and allowances for children, issued on January 26th, it is stated that the regimental pay of officers in the R.F.C. remain as at present except that the pay of a Flight Commander commences at 19s. a day. It is stated that the full allowance of £2 a month in respect of each child, up to a maximum of four, will be issuable to Equipment Officers, 3rd Class, and half rate of £1 a month for each child, up to a maximum of four, will be issuable to Flying or Balloon Officers, Observers and Equipment Officers, 1st and 2nd Class R.F.C.

U.S. Navy Air Service Expanding.

ONE item in the proposed increase of the U.S navy personnel from 80,000 to 180,000 is the increase of the U.S. naval air service from 350 to 10,000.

U.S. Naval Aviators' Badge.

THE U.S. naval authorities have now approved of a distinguishing badge for qualified aviators in the U.S. Navy and Marine Corps. It consists of a winged foul anchor, with the letters U.S. in gold and silver metal. It will be worn on the left breast.

Air Work in Palestine.

In the despatch from General Allenby describing the operations in Palestine from the end of June last year up to the capture of Jerusalem, there are several incidental references to the work of the Royal Flying Corps. Thus it is mentioned that on November 6th airmen noticed movements on the roads north of Gaza enabling the heavy artillery to get to work. During the 8th, "it soon became obvious from the reports of the Royal Flying Corps, who throughout the 7th and 8th attacked the retreating columns with bombs and machine-gun fire, and from other evidence, that the enemy was retiring in considerable disorganisation, and could offer no very serious resistance if pressed with determination.

In the operations on November 10th, "R.F.C. reports indicated the total hostile forces opposed to us on this line [on the Wadi Sukereir] at about 15,000." After the occupation of Jaffa on November 16th, "reports from the R.F.C. indicated that it was the probable intention of the enemy to evacuate Jerusalem and withdraw to organise on this line [Tul Keram-Nablus].

"Among the booty taken at Ludd were five destroyed aeroplanes, and in the operations from October 31st to December 9th more than twenty aeroplanes were destroyed by our airmen or burnt by the enemy to avoid capture."

The Attack on the "Goeben."

THE following announcement was made by the Admiralty on January 24th:—

"In continuation of the former *communiqués*, Royal Naval Air Service machines have made several day and night attacks on the 'Goeben' and have secured two hits with heavy bomb. They have also bombed one of the tugs which were secured alongside the 'Goeben.' In every case heavy anti-aircraft gunfire was encountered, but all our machines have returned safely. These attacks are continuing."

An Admiralty announcement issued on January 25th said:—

"Since issuing the last *communiqué*, aerial attacks on the 'Goeben' have been carried on ceaselessly both by the Royal Naval Air Service and the Royal Flying Corps, and during the last 48 hours some seven tons of bombs were dropped on and around the ship, and on the aerodrome at Galata, several direct hits being observed, and results have been confirmed by photographic reconnaissances. The Turkish cruiser which was near the 'Goeben' has left and proceeded up the Straits, and a steamer which was apparently engaged in lightening the 'Goeben' was forced to desist. The anti-aircraft fire has been very severe, but the only casualty as yet reported is one Greek officer [whose name is unofficially given as Hambas], whose machine was shot down. The operation is continuing."

The Admiralty issued the following announcement on January 28th:—

"Since the last *communiqué* bad weather has hampered operations against the 'Goeben.' Nevertheless several raids have been carried out and some bombs have been dropped on her, and on gun positions at Gaba Tepe. At noon yesterday (the 27th) the position of the ship was unchanged."

A Turkish report issued in Constantinople on January 24th said:—

"In the Dardanelles there was lively aircraft activity. Flight Lieutenant Meinicke brought down an enemy aeroplane, which was burnt, the pilot being killed. A second enemy machine was damaged by Lieutenant Groners in an aerial engagement."

The following was issued in Constantinople on January 28th:—

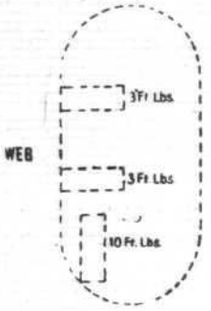
"The Turkish cruiser 'Sultan Selim' ('Goeben") entered on January 27th. She is quite fit for service. The numerous enemy air attacks inflicted only unimportant damage to the funnel and the armoured plating, occasioned by two small bomb hits."

THE 260 H.P. MERCEDES AERO ENGINE.

(*Concluded from page 92.*)

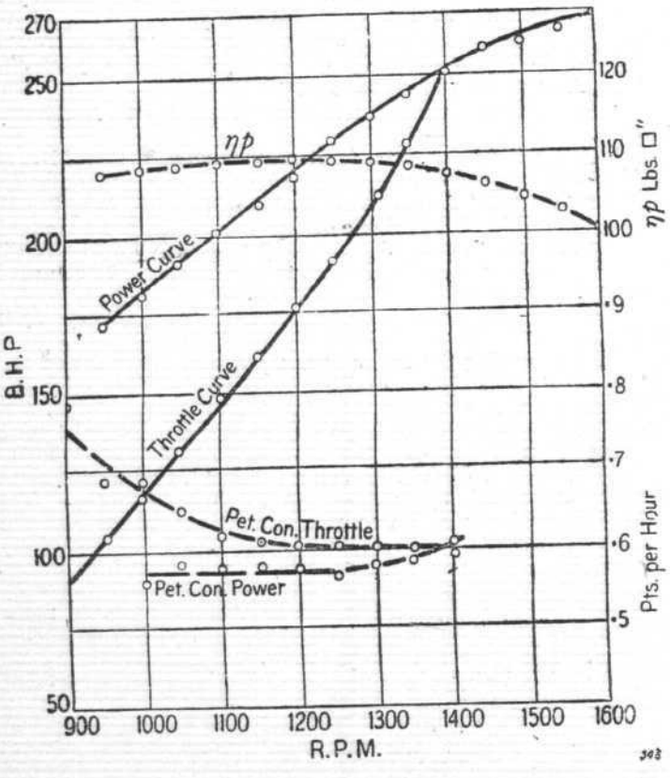
Tests on 260 h.p. Mercedes Engines at R.A.F. 14.7.17.

POWER readings were taken at full throttle from 950 r.p.m. to 1,600 r.p.m., simultaneous fuel consumption readings being taken. During this test the water outlet temperature varied from 75° to 81° C. The water brake was then set to absorb full power at 1,400 r.p.m. and the engine gradually throttled down to 900 r.p.m., power and consumption readings being taken. The results of these tests are shown graphically on the appended chart (C, 335). At the conclusion of the above tests, a run of one hour's duration at 1,400 r.p.m., full throttle, was made with the following results :—



Average b.h.p.	252
Petrol—pints per hour	152.5
pints per h.p. hour	0.605
Oil—pints per hour	8.125
pints per h.p. hour	0.032
Oil temperature at end of run	54.5° C.
Water outlet temperature	80° C.

POWER CURVES, 260-H.P. MERCEDES.



It was noticed that at speeds below 1,150 r.p.m. the vibration was rather excessive.

No adjustments were made to the engine these tests.

MATERIAL SPECIFICATION OF PARTS OF 260 H.P. MERCEDES ENGINE, No. 30111.

Analysis shows the chemical composition of the parts to be as follows :—

Gear Wheel.

	per cent.		per cent.
Carbon	0.30	Phosphorus	0.030
Silicon	0.27	Nickel	4.17
Manganese	0.74	Chromium	1.39
Sulphur	0.025	Vanadium	Nil.

Connecting Rod.

Carbon	0.13	Phosphorus	0.014
Silicon	0.19	Nickel	2.83
Manganese	0.52	Chromium	0.29
Sulphur	0.033		

Camshaft.

Carbon	0.16	Sulphur	0.052
Silicon	0.27	Phosphorus	0.014
Manganese	0.60		

Camshaft Case.

	Body.	Cover.
Carbon	0.24 per cent.	—
Graphitic carbon	—	2.97 per cent.
Combined carbon	—	0.62 ,,
Silicon	0.02 per cent.	1.81 ,,
Manganese	0.46 ,,	0.53 ,,
Sulphur	0.041 ,,	0.118 ,,
Phosphorus	0.012 ,,	0.085 ,,

Valves.

	Exhaust.	Inlet.
Carbon	1.75 per cent.	1.82 per cent.
Silicon	0.58 ,,	0.52 ,,
Manganese	0.10 ,,	0.10 ,,
Sulphur	0.048 ,,	0.048 ,,
Phosphorus	0.013 ,,	0.010 ,,
Nickel	Nil.	Nil.
Chromium	10.85 ,,	10.47 ,,
Vanadium and Tungsten	Nil.	Nil.

Crankcase.

	per cent.		per cent.
Total silicon	0.96	Zinc	3.65
Graphitic silicon	0.35	Iron	0.81
Copper	4.22		

Valve Spring.

Carbon	0.52	Sulphur	0.060
Silicon	0.07	Phosphorus	0.031
Manganese	0.59	Nickel and Chromium,	Nil.

Crankshaft.

Carbon	0.41	Manganese	0.64
Silicon	0.29	Nickel	2.36
Sulphur	0.052	Chronium	0.86
Phosphorus	0.042		

MECHANICAL TESTS.

Mechanical tests on the valve spring gave the following results :—

Outside diameter of spring	1.250 to 1.352 in.
Diameter of wire	1.56 in.
Number of free coils	7
Length of spring	3 in.

Compression in inches.	Load in lbs.	Unloading.
0	0	0
.1	6	4¾
.2	12	10¾
.3	18	16¾
.4	24	23
.5	30	29⅛
.6	36	35⅛
.7	42	41
.8	48	47
.9	54⅜	53⅛
1.0	60⅜	59⅝
1.1	66¾	65⅞
1.2	73½	72½
1.3	81	79¾
1.4	88½	88
Closed 1.5	97⅛	—

Permanent Set, Nil.

Crankcase.

Tensile Test—

Yield point	8.7 tons per sq. in.
Maximum stress	9.35 ,, ,,
Elongation	3.55 per cent. on 2 in.
Reduction of area	3.5 per cent.
Specific gravity	2.867

Crankshaft.

Tensile Test—

Yield point	55.7 tons per sq. in.
Maximum stress	62.0 ,, ,,
Elongation	13.5 per cent. on 2 in.
Reduction of area	23.5 per cent.

Impact Test on Crankshaft—
23 ft. lbs. } on boss in direction of shaft.
16 ft. lbs. }
10 ft. lbs. }
3 ft. lbs. } on place as indicated in attached sketch.
3 ft. lbs. }

B. M. DEPARTMENT, R.A.F.
July 16th, 1917.

ENGINE DATA.

Number and arrangement of cylinders	6 (vertical, separate)
Bore	6.30 in.
Stroke	7.09 in.
Stroke/Bore ratio	1.125—1
Normal b.h.p.	252
Normal speed	1,400 r.p.m.
Piston speed	1,655 ft. min. (27.6 ft. sec.)
Area of one piston	31.17 sq. in.
Total piston area of engine	187.02 sq. in.
Swept volume of one cylinder	221 cub. in.
Total swept volume of engine	1,326 cub. in.
Volume of clearance space	56.10 cub. in.
Compression ratio, total vol./clearance vol.	4.94—1
Air standard efficiency	47.30 per cent.
Brake mean pressure	107.50 lbs.
Mechanical efficiency (calculated)	87.90 per cent.
Indicated mean pressure (calculated)	122.35 lbs. sq. in.
Fuel consumption (lb. per b.h.p. hour)	0.541 lbs.
Brake thermal efficiency (18,500 B.T.U.'s lb.)	25.46 per cent.
Indicated thermal efficiency	28.96 ,,
Relative efficiency	61.20 ,,

FRICTION LOSSES (CALCULATED).
(In terms of lbs. per sq. in. of piston area.)

Bearings, valve gear and auxiliaries	2.50 lbs. per sq. in.
Fluid pumping losses	4.50 ,, ,,
Piston friction	7.85 ,, ,,
Total losses	14.85 ,, ,,
Brake mean pressure	107.50 ,, ,,
Mechanical efficiency, 107.50/122.35	87.90 per cent.

GAS VELOCITIES, VALVE AREAS, &c.

Gas Velocity.

Choke tube	302.0 ft. per sec.
Vertical induction pipe	70.2 ,,
Induction manifold	125.6 ,,
Inlet port	115.6 ,,
Inlet valve	158.0 ,,
Exhaust valve	158.0 ,,
Exhaust port	115.6 ,,

Cross Section Area.

Choke tube	*See* drawing of carburettor (total, 2,850 sq. in.)
Vertical induction pipe	12.18 sq. in.
Induction manifold	6.86 ,,
Inlet port (total)	7.44 ,,
Inlet valve (total) (dh.)	5.45 ,,
Exhaust valve (total) (dh.)	5.38 ,,
Exhaust port (total)	7.44 ,,

Diameter.

Choke tube	*See* drawing of carburettor
Vertical induction pipe	3.937 in.
Induction manifold	2.953 ,,
Inlet port (each)	2.175 ,,
Exhaust port (each)	2.175 ,,

Inlet valve (two per cylinder)—

Outside diameter of valve	2.362 in.
Lift of valve	0.398 ,,
Width of seating	0.0787 ,,
Diameter of stem, in guide	0.433 ,,
Diameter of stem, below guide	0.433 ,,
Radius under valve head	0.394 ,,
Length of valve guide	3.818 ,,
Length of spring, valve closed	2.362 ,,
Ratio—Length of spring lift of valve	5.95 —1

Exhaust valve (two per cylinder)—

Outside diameter of valve	2.362 in.
Lift of valve	0.395 ,,
Width of seating	0.0787 ,,
Diameter of stem, in guide	0.433 ,,
Diameter of stem, below guide	0.433 ,,
Radius under valve head	0.394 ,,
Length of valve guide	3.818 ,,
Length of spring, valve closed	2.362 ,,
Ratio—Length of spring lift of valve	5.99 —1

INERTIA STRESSES, LOADING ON CRANK-PIN BEARING, &c.

Weight of piston, complete with rings, gudgeon pin, &c.	10.725 lbs.
Weight per sq. in. piston area	0.344 lb.
Weight of connecting rod, complete with bearings	7.00 lbs.
Total reciprocating weight per cylinder	13.225 lbs.
Weight per sq. in. piston area	0.424 lb.
Length of connecting rod between centres	12.835 in.
Ratio, connecting rod/crank-throw (l./r.)	3.62 — 1
Inertia pressure, lbs. per sq. in. piston area—	
Top centre	106.70 lbs. sq. in.
Bottom centre	60.50 ,, ,,
Mean	83.60 ,, ,,
Weight of rotating mass of connecting rod	4.50 lbs.
Total centrifugal pressure	887 ,,
Centrifugal pressure, lbs. sq. in. piston area	28.45 lbs. sq. in.
Total loading due to inertia and centrifugal pressures	112.05 ,, ,,
Mean average fluid pressure, including compression and pumping strokes	44.00 ,, ,,
Mean average loading on connecting rod bearing, total from all sources in terms of lbs. per sq. in. on piston area (⅔ inertia)	128,120 ,, ,,
Diameter of crank-pin	2.520 ins.
Rubbing velocity	15.40 ft. per sec.
Projected area of big-end bearing	8.80 sq. in.
Ratio, piston area/projected area big-end bearing	3.545 — 1
Mean average pressure on big-end bearing	454.00 lbs. sq. in.
Loading on connecting rod big-end bolts—	
Maximum load due to inertia at 1,400 r.p.m.	3,328 lbs.
Maximum load due to inertia at 1,600 r.p.m.	4,338 ,,
Maximum load due to centrifugal force at 1,400 r.p.m.	887 ,,
Maximum load due to centrifugal force at 1,600 r.p.m.	1,163 ,,
Total load on bolts at 1,400 r.p.m.	4,215 ,,
Total load on bolts at 1,600 r.p.m.	5,501 ,,
Number of bolts	Four
Full diameter of bolts	0.4724 in.
Total cross-sectional area at bottom of thread	0.580 sq. in.
Stress per sq. in. at 1,400 r.p.m.	7,270 lbs. sq. in.
Stress per sq. in. at 1,600 r.p.m.	9,990 ,, ,,

Industrial Reconstruction.

THE Lord Mayor will preside at the inaugural meeting of the Industrial Reconstruction Council which is to be held on Friday, February 15th, at 3 p.m., at the Guildhall, London. Dr. Addison (Minister of Reconstruction), Mr. G. H. Roberts (Minister of Labour), Lord Burnham, Mr. J. H. Whitley, and other speakers representative of all industrial interests, will deal with the practical problems of Industrial Reconstruction. This is the first of a series of important meetings which the Reconstruction Council is arranging with the object of focussing public opinion upon the tremendous industrial problems that will arise at the end of the war. Applications for tickets should be made to the Secretary, The Industrial Reconstruction Council, 8, Bouverie Street E.C. 4.

AIRISMS FROM THE FOUR WINDS.

QUESTIONS and answers in Parliament, whether the latter are "in the negative" or otherwise, will hardly alter the fact, which is pretty common knowledge, that the Geman authorities are deliberately placing both our own and French officer prisoners of war in places of peril in towns which there is every legitimate reason for our Flying Services to bomb. Mr. Butcher was inquisitive upon this point last week, and once again put forward the excellent suggestion to the Under Secretary for War of sending German officer prisoners of war, from Donington Hall and elsewhere to London or other places where they would be subject to the risk of German air raids on non-combatants and women and children, and of utilising Donington Hall as a hospital for our wounded soldiers. Mr. Macpherson, without promising any action in this direction, admitted that rumours had even reached him, and intimated that the Government was going as far as to inquire as to the truth of these rumours. So that we may now hope next year or the year after, a few selected Yunker Knuts may find their quarters shifted to the "fortress" of London or such fortified towns as Margate and Ramsgate.

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ALWAYS provided the pick of the said Knuts have not already been restored to their over-sensitive sorrowing relatives in Hunland. That's where a few hostages of Kultur like Tirpitz would now have come in handy, had they not been bargained away in exchange.

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As Lord Lieutenant of Buckinghamshire, the Marquis of Lincolnshire on Monday, when addressing, at High Wycombe, a "Gathering of Welcome" to some 200 Bucks active service men, discharged from the Army and Navy, in very convincing terms gave his version of the meaning of "The King of England," when honour was accorded to that toast throughout the Empire from members of the most truly democratic constitution in the world. It comes home to us the more when we see the hideous chaos which the attempt has brought about, to run a country like Russia upon so-called democratic principles.

"As a representative of the King," Lord Lincolnshire said, "I want you to consider what those four words 'The King of England' really mean. When as loyal men after dinner you drink the King's health, you are not only drinking the health of the man who so worthily wears the Crown of King Alfred, and who, in his own person, and through other men, represents the stability of this glorious Empire. You are drinking to law and order and liberty and justice. You are drinking to the judges on the Bench, and to the Parliaments all over the world that are elected by and responsible to the people. You are drinking to the great native Princes and huge populations of India, to the Confederation of Australia, to the Dominions of Canada, to the Union of South Africa, and to every great pioneer who has left his own country and sailed to plant the British flag in the most distant parts of the globe. Do remember when you drink the health of the great Constitutional Monarch of this country that you are drinking to the prosperity and the luck of all those gallant men who have gone out and bled for the Empire."

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QUITE a good idea of Sir Woodman Burbidge to throw open the immense facilities of Messrs. Harrods, Ltd., for the illustration of the organisation and work of the Women's Army Auxiliary Corps, the Women's Royal Naval Service, and women's work in the Royal Flying Corps. By this means ocular demonstration will be afforded by means of a collection of photographs of the various phases of life in these services. The uniforms of the services will be exhibited, and there will be show cases of badges, rank marks, and similar objects. Daily addresses are to be given by women speakers, outlining the work of these branches of war service, both from the technical and from the domestic sides, and much interesting information will be available regarding life and conditions with the women's forces.

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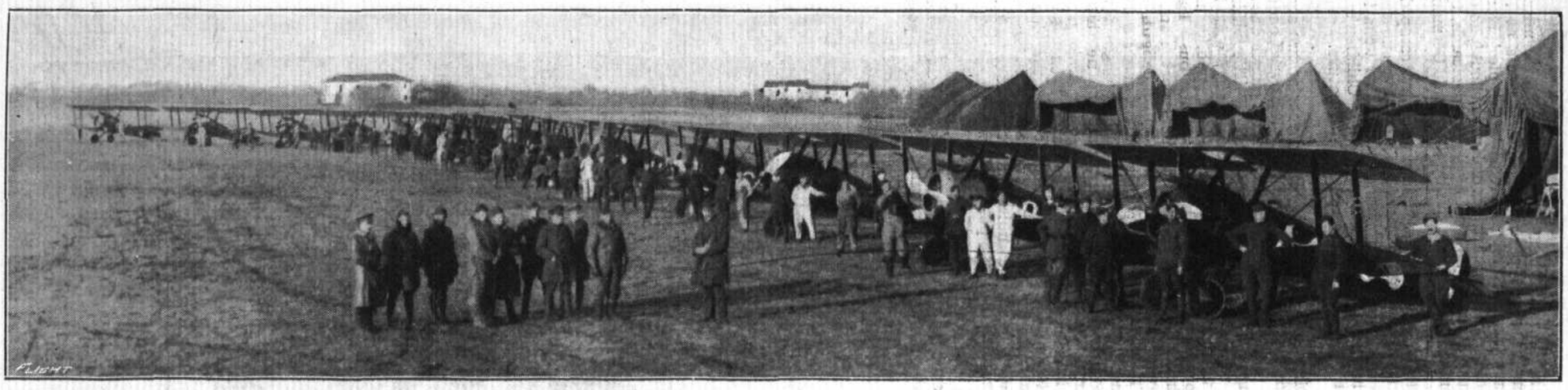
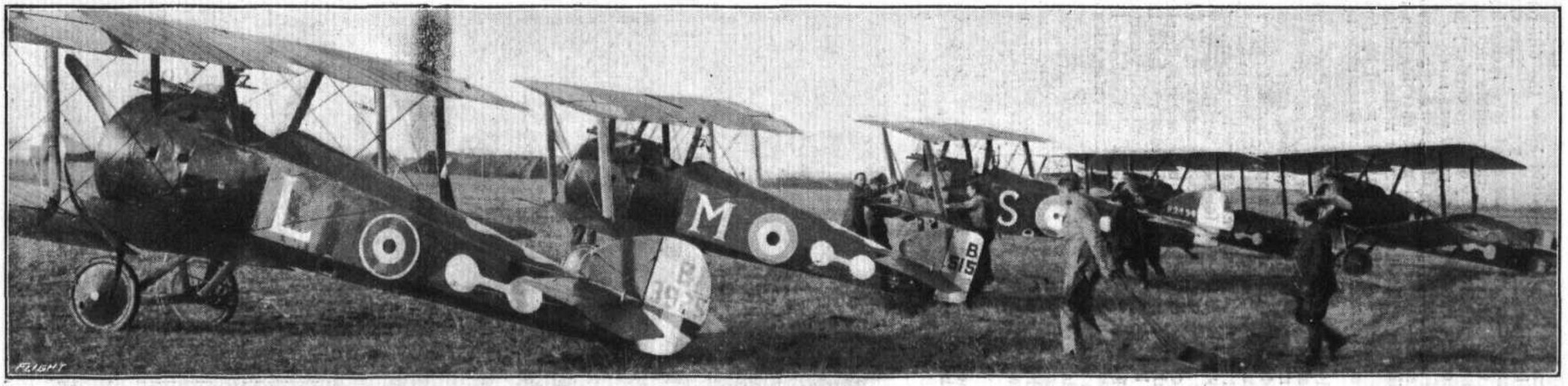
THE appropriation of £200,000,000 in addition to the £128,000,000 already set aside for aviation by the United States Government is strongly supported by General Squier, the Chief of the N.S. Signal Corps. It'll be wanted, and more.

"British Official."
On the British Western Front in France. A Gotha strafer, who recently brought down a Gotha aeroplane.



" British Official."

WITH THE BRITISH FORCES IN ITALY.—The squadron that has accounted for many Hun planes, lined up before departure.



" British Official."

WITH THE BRITISH FORCES IN ITALY.—Scene at an aerodrome.

SURELY farmers, if any one, should know the difference between homing pigeons and wood pigeons. Yet these valuable message carriers have been of late increasingly destroyed by them, and others, to the possible undoing of many schemes upon which the safety of these carrier pigeons depend. Some time back a public appeal was made to give the benefit of the doubt to the bird—where any possible doubt might exist—but the discretionless shooting has unfortunately still continued and the further notice now issued officially, goes a step further, pointing the moral by giving actual instances of what the slaughtering of these messengers may entail.

It is pointed out, in fact, that the work of the Government pigeons is sometimes literally a matter of life and death to our fighting men, many of whom owe their lives to the speed of the birds. A notable case is that of Skipper Thomas Crisp, V.C,, who died at the wheel under fire from a German submarine, but lived long enough to send a message by pigeon. The bird flew away with his appeal for help for the crew, and, thanks to the timely arrival of the messenger, they were saved. On another occasion a flying boat and a hydroplane got into difficulties in stormy weather, and it was feard that all lives would be lost. A pigeon was sent out with a message calling for help, and in the face of a fierce wind the bird managed to make its way home. It died from exhaustion on arrival, but its message had been delivered, help was sent to the crews in danger, and the lives of all were saved. The official warning to the thoughtless to avoid shooting homing birds is backed up by a reminder that heavy penalties may be, and in some cases have been, inflicted by the magistrates on offenders.

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TOWARDS the £1,000 which is being raised to provide memorials to the children who were killed in an air raid last year, the Mayor of Poplar has now received over £700. The fund will be expended partly in erecting marble memorials in the cemeteries and partly in endowing cots at Poplar Hospital and at Sir William Treloar's Cripples' Home at Alton, Hants. These mementoes of Kultur should, no doubt, help presently to make up a set of picture postcards, typical of the humane war as carried out by the Gentle German.

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FOR those air-raid children victims who have escaped with their lives from different districts but who have suffered bad shock, the Lord Mayor has just sent a further donation of £50 from his Air-Raid Relief Fund to the Children's Fresh Air Mission, which deals with cases of this nature.

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OTHER times, other manners. But a year or two ago and dire penalties would have followed the flying over London by any pilot. Now it is but an incident for a glance above by the moving crowd. On Saturday last a little variation, according to the report of a London daily, was introduced to tighten up the interest of the public in the doings of our watchers up on high. "In the busy leaving-business time of the afternoon," so the report runs, "an airman provided a wonderful exhibition which delighted large crowds in Trafalgar-square. With apparent ease he showed complete mastery of his machine, which he brought down to within a few yards of roofs in the square and neighbouring thoroughfares. Banking, gliding, and other feats preluded circling the Nelson Column, and the display was concluded with gracefully executed demonstration of looping the loop over the National Gallery." Allowing for a latitude in the heights of performance, the little exhibition must have been a healthy object-lesson to many in the passing crowd.

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APROPOS Democracy and the State, again Mr. G. H. Roberts has been setting out some sound common-sense truths which may well be distributed as widely as possible.

"British Official."

OUR BOMBING AIRMEN VISIT GERMAN TOWNS.—Mannheim during the raid on December 24th, 1917.

The occasion this time was at the opening of new and larger premises in Dean Street, Soho, for the Special Employment Exchange for Discharged Soldiers, up to now carried on in Tottenham Court Road. Mr. Roberts said that experience had taught him that the view he once held that State machinery was a panacea for all ills was not very sound. During the war those who previously clamoured for State control now exhibited resentment against it and were asking for decentralisation. He was certain that if responsible persons were charged with duties in their respective localities they could accomplish them much better than was possible by centralised control. Therefore Labour Advisory Committees had been established.

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MORE or less linked up with this question is also the matter of wages and the solution of the industrial problem generally. This is especially germain just now when there is so much talk floating about as to the future idealistic state of existence for labour, letting every other section of the community go rip. Recently in the Press Mr. W. L. Hichens has been discussing this side of Socialism, and "A Manufacturer" in reply has dissected the arguments put forward and has exposed, in a nutshell, of the case, as a combination in opposition, of trade-union labour—high wages (=costly production) and low prices of commodities and the necessaries of life (=free trade). "Manufacturer" summarises Mr. W. L. Hichens' arguments by pointing out that after admitting that State control of wages has in the past failed, he suggests that the solution of the industrial problem lies beyond all economic laws and doctrines, and depends on our moral code. To attain this purpose he proposes :—

1. That profits are to be restricted, and taxed for the good of the community by means of a continuation of the excess profits tax.

2. Reward of labour must in last resort be decided by the State as representing the community, labour having no more right than capital to make a corner in its commodity and hold the community up to ransom.

3. The workers to be entitled to have an effective voice in the general conditions under which work is carried on. The responsibility of fixing piece rates and time rates to rest on joint district councils linked up with joint industrial councils.

4. First step on return of peace should be the establishment of an eight-hour day as a first instalment towards further reductions, if experiment shows this is possible consistently with requirements of civilised existence.

5. These reforms will require large sums of money, and will, moreover, be of little or no avail unless a high standard of wages is established.

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COMING to the other side of the picture "Manufacturer" comments as follows: "Granted if you will that these proposals will attain the desired end—namely, an improved civilised existence for the worker—how is it to be brought about 'without the crutches of a protective tariff' and 'beyond all economic laws'? The proposals he makes in fact not only involve the State intervention, but the establishment of a high standard of wages. Now, however pleased an employer may be to agree to the payment of high wages, he has to sell his goods on the world's market, or on the home market in face of the competition of other countries. The British manufacturer's article has to bear trade-union prices, or in Mr. Hichen's scheme prices fixed by the State Joint Industrial Councils, and contribute to a widely extended unemployment insurance benefit, and his men are to work eight hours or less per day. The foreign article may come from a country where there is no trade union, or if there is one, where the standard of wages is not nearly so high, and where the State has not interfered in the beneficent way Mr. Hichens suggests. To be able to meet this foreign competition we are to have drastic economies in production and increase of production. No strikes, no indifferent workmanship, up-to-date machinery, cheap transport, &c. But all this is open to the foreigner to adopt without the additional highly protected labour and State exactions. It seems to me if labour is to be protected it should be done by an International Trades Union. Failing this, then the article produced by unprotected labour will knock out the protected article. An increasingly protected labour and free imports cannot surely meet the case, and in fact the one is a contradiction of the other. By all means let the light in on all dark places as Mr. Hichens suggests, but is his scheme practical, and will it bring about the desired result with which one must sympathise ?"

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Apropos the very mixed lists of honours which have now become the vogue of war times, the following story has considerable point for thought amongst some of the really old political nobility of 1910 or so :—

Lady Diner (rather loftily) : "Oh, yes. Lady —— ? Of course, I know her. But her title is quite one of the newest creations, isn't it ?"

New Scottish Knight's Lady (with a native sense of humour) : "To be sure it is. It was in the very latest list. Why, *our* family was founded *before the Third War Loan.*"

TEN YEARS AGO.

Excerpts from the "AUTO." ("FLIGHT'S" precursor and sister Journal of 1908. "FLIGHT" was founded at the latter end of 1908.

HENRY FARMAN WINS THE *Daily Mail* £100 PRIZE.

IT has been officially announced by the *Daily Mail* that it has awarded Mr. Henry Farman the £100 prize for the "circular half-mile," this distance having been accomplished with that of the full kilometre.

BRITISH MILITARY AERONAUTICS.

ACCORDING to a correspondent in our contemporary, the *Daily Telegraph*, the army aeroplane now building at Aldershot is progressing apace, and in the course of a few weeks may be expected to be taken out for a trial on Cove Common if weather permits.

"X" AIRCRAFT RAIDS.

IN view of the decision of the Government not to allow details of places visited by enemy aircraft to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

"X 87" Raid (January 28th–29th).

THE following *communiqués* were issued by the Field-Marshal Commanding-in Chief Home Forces :—

"*January 28th*, 11.15 *p.m.*

"Hostile aeroplanes crossed the Kent and Essex coasts shortly before 8 p.m., and proceeded towards London. Some machines penetrated to the capital, where bombs were dropped between 9 and 10 p.m. Latest reports show that one enemy machine was brought down by our airmen in Essex."

"*January 29th*, 12.45 *a.m.*

"A further attack was delivered on London after midnight, bombs being dropped about 12.30. The raid is still in progress."

"*January 29th*, 11,30 *a.m.*

"Latest information shows that two groups of raiders crossed the Essex coast, and one group the Kent coast, practically simultaneously about 8 p.m. The two former detachments proceeded towards London on parallel courses across Essex; the capital was approached from the east and north-east shortly after 9 p.m. Of the machines which crossed the Kent coast, two dropped bombs in the Isles of Thanet and Sheppey; the remainder, crossing the Thames estuary, also approached East London through Essex. Apparently about 15 machines took part in these attacks, of which four or five reached the capital and dropped bombs in various districts between 9 and 10 p.m. Some time after the first attack had terminated other enemy aeroplanes crossed the Essex coast. Only one of these reached London, which was entered from the north, bombs being dropped between 12.15 and 12.30 a.m. A number of machines of the R.F.C. went up. Two of our scouts encountered an enemy aeroplane over Essex. After a brief fight at close range, the raider took fire, and fell in flames to the ground 10,000 ft. below. All three members of its crew were burnt to death. Several other engagements with enemy machines are reported by our pilots, one of whom pursued a raider across the coast and fought an indecisive engagement over the sea. All our pilots returned safely. Reports of casualties will be published when complete lists have been received."

"3.30 *p.m.*

"Latest police reports state that the casualties caused by last night's air raid in all districts visited by enemy aeroplanes were :—Killed : men, 14; women, 17; children, 16; total, 47. Injured: Men, 93; women, 59; children, 17; total, 169. With the exception of one killed and seven injured, all the above casualties occurred in London. Material damage was not serious."

German Version.

"Berlin, *January 29th.*

"Bombs were dropped yesterday on London and Sheerness with good effect."

INTERNATIONAL AIRCRAFT STANDARDS.

(*Continued from page* 104.)

3S28—*Specifications for Alloy Steel Sheet.*

GENERAL.—1. The general specifications, 1G1, shall form according to their applicability, a part of these specifications.

MATERIAL.—2. The material for these sheets shall be chosen from the I.A.S.B. standard alloy steels listed below:

CHEMICAL COMPOSITION OF STANDARD ALLOY STEELS.

NICKEL STEELS.

Number.	Carbon.	Manganese.	Phosphorus, maximum.	Sulphur, maximum.	Nickel.	Chromium.
2315	0.10–0.20	0.30–0.60	0.040	0.045	3.25–3.75	—
2320	0.15–0.25	0.30–0.60	0.040	0.045	3.25–3.75	—
2325	0.20–0.30	0.50–0.80	0.040	0.045	3.25–3.75	—

NICKEL-CHROMIUM STEELS.

3120	0.15–0.25	0.30–0.60	0.040	0.045	1.00–1.50	0.45–0.75
3215	0.10–0.20	0.30–0.50	0.040	0.045	1.50–2.00	0.90–1.25
X 3315	0.10–0.20	0.30–0.60	0.040	0.045	2.75–3.25	0.70–1.95
3315	0.10–0.20	0.30–0.60	0.040	0.045	3.25–3.75	1.25–1.75

CHROMIUM-VANADIUM STEELS.

Number.	Carbon.	Manganese.	Phosphorus, maximum.	Sulphur, maximum.	Chromium.	Vanadium, minimum.
6120	0.15–0.25	0.30–0.60	0.040	0.045	0.60–0.90	0.15

The composition shall be stated by the manufacturer or contractor and is further limited as follows: Carbon, not over 0.25 per cent.

MANUFACTURE.—3. (*a*) The steel shall be manufactured, or at least finished, by the open-hearth, electric-furnace, or crucible process.

(*b*) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

(*c*) Sheets, unless ordered cold-rolled, shall be full pickled.

(*d*) Sheets are to be well and uniformly annealed in accordance with good commercial practice. For sheets lighter than 0.065 in. (1.65 mm.), box annealing is preferred. For sheets 0.065 in. (1.65 mm.) and thicker, open annealing is preferred.

Heat Treatment.—(*e*) The manufacturer shall state the heat treatment recommended to give the physical properties specified.

WORKMANSHIP AND FINISH.—4. (*a*) The sheets must be commercially flat, clean, smooth, free from seams, laminations, blisters, and other surface defects. They must be uniform in quality, and within the stipulated margins of manufacture.

(*b*) Any sheet may be rejected because of injurious defects or faults in manufacture at any time, notwithstanding that it has previously been accepted by the inspector; it shall be returned to the manufacturer at the latter's expense. This clause shall not be taken to apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5. (*a*) Specimens cut in any direction from the heat-treated sheets shall have the following properties:—

Tensile Test.—(*b*) Minimum tensile strength, 100,000 lbs. per sq. in. (70.30 kg. per mm.^{2}); minimum yield point, 75,000 lbs. per sq. in. (52,73 kg. per mm.^{2}); minimum elongation, 15 per cent. in 4 ins. (101.6 mm.).

Bend Test.—(*c*) Strips cut from annealed sheets shall stand being bent cold through an angle of 180 deg., in any direction, to a radius equal to the thickness of the sheet without fracture.

(*d*) Strips 1½ ins. (31.75 mm.) wide cut from annealed sheets and with edges rounded, shall stand reversed bending, cold, through an angle of 90 deg. for not less than three complete reversals, without fracture. The test is to be made in a square-nose vice, the edges over which the specimen is bent being rounded to a radius equal to three times the thickness of the sheet.

SELECTION OF TEST SPECIMENS.—6. Three sheets shall be taken from each annealing box to represent the top, middle, and bottom of the stack, or one sheet from each 25 when sheets are open annealed. One tensile, one bending, and one reverse bending test, shall be made from each sheet selected.

DIMENSIONS AND TOLERANCES.—7. The dimensions and tolerances shall be those given in the table below and in the specifications 3S11. The thickness will be specified in decimals of an inch or millimetres:

TABLE OF TOLERANCES FOR STANDARD STEE SHEETS.

Thickness.		Tolerance for sheets 14 ins. (35.6 cm.) wide and under.		Tolerance for sheets over 14 ins. (35.6 cm.) wide.	
Inches.	Millimetres.	Inches.	Millimetres.	Inches.	Millimetres.
0–0.020	0.51	+0.001 −0.002	+0.03 +0.05	±0.002	±0.05
0.021–0.030	0.54–0.76	+0.002 −0.003	+0.05 −0.08	±0.003	±0.08
0.031–0.040	0.79–1.02	±0.003	±0.08	±0.003	±0.08
0.041–0.050	1.05–1.27	±0.003	±0.08	±0.004	±0.10
0.051–0.065	1.30–1.65	±0.004	±0.10	±0.004	±0.10
0.066–0.080	1.68–2.03	±0.004	±0.10	±0.005	±0.13
0.801–0.100	2.06–2.54	±0.006	±0.15	±0.006	±0.15
0.101–0.120	2.57–3.05	±0.006	±0.15	±0.007	±0.18
0.121–0.250	3.08–6.35	±0.006	±0.15	±0.008	±0.20

DELIVERY, PACKING, AND SHIPPING.—8. (*a*) Sheets shall be cut to the required dimensions and shall be ordered in as narrow widths as can be used.

(*b*) All sheets shall be oiled for protection against corrosion.

(*c*) Sheets 0.065 in. (1.65 mm.) or thinner shall be boxed, the weight of the box with contents not to exceed 220 lbs. (100 kg.).

(*d*) Sheets thicker than 0.065 in. (1.65 mm.), up to and including 0.125 in. (3.18 mm.), shall be crated, the weight of crate and contents not to exceed 220 lbs. (100 kg.).

(*e*) Sheets thicker than 0.125 in. (3.18 mm.) may be bundled, the weight of bundle not to exceed 220 lbs. (100 kg.).

When electric or crucible furnace steel is specified in the order, the maximum allowable percentages of phosphorus and sulphur may, at the option of the purchaser, be limited to 9·03 per cent.

(*To be continued.*)

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To Help the Italian Loan.

MATERIAL assistance in putting forward the attractions of the new Italian War Loan was afforded by a shower of leaflets dropped from a fleet of three dirigibles, five Caproni and two Farman aeroplanes, with the Under-Secretary of the Treasury, Signor Visocchi, and the Under-Secretary of Aviation, Signor Chiesa, on board, which flew over Rome on Monday.

Hun Attacks on Italian Hospitals.

"HELPED by an almost full moon and by a low-lying mist, which hampered the anti-aircraft gunners, enemy airmen during the night of January 26th raided towns in the Venetian plain, and came back again and again at intervals until dawn." says Mr. G. Ward Price, writing to the *Times* from the Italian headquarters.

"Mestre, which stands on the shore of the lagoon surrounding Venice, was their chief victim. Here they killed and wounded seven women and children. They also killed some ambulance men who had come into the town to pick up the victims of the raid, and then did considerable damage to three hospitals, cracking their walls from top to bottom."

"Canada in Khaki."

THE first volume of "Canada in Khaki" was excellent value, but the second volume, which is just issued, is super-excellent value at 3s., and the sale should very materially help the Canadian War Memorial Fund which exists to provide the Dominion with a pictorial record worthy of the heroic deeds of her sons. Included in the 200 pages are stories, articles or verse by Mr. Max Pemberton, Major C. G. D. Roberts, Mr. Edwin Pugh, Mr. Pett Ridge, Miss Jessie Pope, Mr. Philip Gibbs, Mr. Percival Phillips, Mr. Perry Robinson, Mr. Beach Thomas, and Mr. St. John Adcock, while the illustrations (including ten coloured plates) are the work of such artists as Mr. Byam Shaw, Major Richard Jack, Prof. G. Moira, Mr. Dudley Hardy, Mr. Heath Robinson, and Major Bairnsfather.

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Pan-American Aero Show Abandoned.

ANNOUNCEMENT has been made by the Organisation Committee of the Second Pan-American Aeronautical Exposition which was to have been held in the Grand Central Palace, New York, opening on Feb. 16th, that the exhibition is to be postponed in order to keep clear of any possibility of congesting transport. A series of aeronautical conferences are to be held instead of a show.

Another Record by Miss Stinson.

A FEW details are now to hand of a new American non-stop record made by Miss Katherine Stinsou, on a triplane, on Dec. 11th. She flew from San Diego to San Francisco—610 miles in 9 hrs. 10 mins.; crossing the Tehachapi mountains in Southern California at 9,000 feet. This trip beats Miss Ruth Law's record of 512 miles between Chicago and Hornell, N.Y., made on Nov. 19th, 1916.

The British Air Services

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

Admiralty, January 21st.

The following Prob. Flight Officers (Temp.) have been promoted to Flight Sub-Lieutenants (Temp.), with original seniority :—B. F. Jackson, E. C. Stocker, R. W. Robinson, W. Gilman, L. C. Messiter, J. H. Leamesley, C. C. Dews, H. E. Forrow, S. C. Joseph, G. W. Graham, K. R. Cole, and J. A. Radcliffe.

Prob. Observer Officers.—C. A. Bradham and F. Porter, both promoted to Observer Sub-Lieuts., seniority Jan. 5th.

Prob. Observer Officers (Temporary).—L. A. Christian, J. W. Nixon, A. E. Horn, H. A. Havilland-Roe, and E. D. Harding, all promoted to Observer Sub-Lieuts. (Temp.), seniority Jan. 5th.

The undermentioned have been entered as Prob. Flight Officers (Temp.) :—R. A. Fawcett, H. W. Pickford, D. L. B. Morgan, S. J. Stacey, D'A. B. Recordon, G. N. Oats, G. S. Thomas, J. T. Phillips, J. A. Kenyon, S. C. Capes, J. W. Watson, G. T. Burton, and W. E. Titchmarsh.

Mr. R. J. M. Sennett promoted to Wt. Officer, 2nd grade, seniority Jan. 4th.

Temp. commissions as Lieut. (R.N.V.R.) have been granted to C. J. Griffiths and F. C. Sheppard, seniority respectively Jan. 16th and 28th.

Admiralty, January 22nd.

Probationary Flight Officers (Temporary).—R. W. J. Weekes, R. J. Nixon, J. D. Patterson, H. F. Blackborow, B. R. Digby, H. W. B. Coombs, and S. J. Mawdsley, all promoted to Flight Sub-Lieuts. (Temp.), with original seniority.

Captain, R.M.A. (Temporary).—J. H. D'Albiac, D.S.O., entered as Proby. Flt. Comr. (Temp.), seniority Dec. 31st.

Warrant Officers, 2nd Grade (Temporary).—W. A. Kingston and W. J. Standish, both granted temp. commissions as Lieut. (R.N.V.R.), seniority respectively Jan. 4th and 8th.

Temp. commissions as Lieut. (R.N.V.R.) have been granted to the following, seniority as stated :—A. D. S. Rice ; Dec. 29th. J. W. V. Paul ; Jan. 2nd. H. Jeffreyes and A. C. Osborne ; Jan. 20th.

Admiralty, January 23rd.

The following have been entered as Proby. Flt. Officers (Temp.).—L. S. Rands, J. R. Roskilly, J. W. N. Oliver, C. H. Ratcliffe, W. G. Piper, and B. A. Elliman. Messrs. J. Gargan, L. G. Gathrall, F. G. Porter, W. R. Hudson, and L. H. Kemp, all entered as Proby. Observer Officers (Temp.).

Temp. commissions (R.N.V.R.) have been granted to the following :—Lieuts.—W. C. Short, B. Collbran, C. R. Lodge, and C. S. Johnston. Sub-Lieuts.—R. M. Armfield, R. Warner, D. Longbottom, C. A. Hurst, and B. R. Bostock.

Admiralty, January 24th.

Flight Commander.—H. Stewart, promoted to rank of Squadron Comdr., seniority Dec. 31st.

The following Proby. Flight Officers (Temp.) have been promoted to rank of Flight Sub-Lieut. (Temp.) seniority as stated :—S. Smith ; Nov. 25th, 1917. C. N. T. Jellings and H. B. Clifford, both Dec. 9th. H. P. D. Lane and J. H. Holland, and E. C. B. Wright, all Jan. 9th.

Probationary Flight Officers (Temporary).—J. H. Barnett and F. R. Dunn, both entered as Proby. Observ. Officers (Temp.), seniority respectively Sept. 30th and Oct. 5th, 1917.

Sub-Lieutenant (Temporary R.N.V.R.).—L. Taverner, promoted to Lieut. (Temp. R.N.V.R.), seniority, Jan. 1st.

Temp. commissions (R.N.V.R.) have been granted, seniority as stated :—Lieuts.—A. E. Harford ; Jan. 27th. And L. E. Anstey-Bennett ; Jan. 28th. Sub-Lieuts.—B. H. England (Ty. Wt. Offr. II.) ; Jan. 8th ; and H. Marsh ; Jan. 28th.

Admiralty, January 28th.

Flight Sub-Lieutenant (Temporary).—J. K. Fryer-Smith, promoted to rank of Flight Lieut (Temp.), seniority Dec. 31st.

Messrs. L. A. Hill, C. A. H. Harrison, and S. H. Mabbott, all entered as Proby. Flight Officers (Temp.), seniority respectively Jan. 23rd, Feb. 4th and Feb. 4th.

Temp. commissions as Sub-Lieuts. (R.N.V.R.) have been granted, seniority as stated :—W. J. Metcalfe, Jan. 27th ; and C. J. Fenwick, Feb. 4th.

Royal Flying Corps (Military Wing).

London Gazette Supplement, January 21st.

The following appointments are made :—

Flying Officers.—Lieut. K. P. Campbell, Canadian Exped. Force : Dec. 12th, 1917. 2nd Lieut. J. A. McCudden ; Dec. 17th, 1917. Temp. Lieut. P. La T. Foster, Gen. List, from a Flying Officer (Obs.), seniority from Feb. 12th, 1917, Temp. 2nd Lieut. J. E. A. R. Daly, Br. W. Indies R., from a Flying Officer (Obs.), seniority from Dec. 27th, 1916, 2nd Lieut. N. W. R. Mawle, Lond. R., T.F., and to be secd., Temp. 2nd Lieut. P. D. Parker, Res. Regts. of Cav. (since decd.), and to be transfd. to R.F.C. Gen. List, Lieut. G. A. Mercer, Canadian Cyclist Corps ; Dec. 27th, 1917. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank :—E. J. Dillon ; Oct. 15th, 1917. T. S. A. Proudfoot ; Oct. 17th, 1917. A. L. Allan ; Dec. 18th, 1917. L. H. Kearne ; Dec. 21st, 1917. F. C. Bailey ; Dec. 28th, 1917. R. T. Cuffe ; Dec. 31st, 1917.

Flying Officers (Observers).—Temp. 2nd Lieut. E. L. Shaw, S. Staff. R., and to be transfd. to R.F.C. Gen. List ; Nov. 29th, 1917, seniority from July 30th, 1917. Temp. 2nd Lieut. R. V. Hope, S. Lan. R., and to be transfd. to R.F.C. Gen. List ; Nov. 30th, 1917, seniority from Sept. 10th, 1917. Nov. 30th, 1917, seniority from Oct. 11th, 1917 :—Lieut. G. W. G. Tucker, R.F.A., S.R. ; Temp. 2nd Lieut. J. Anderson, A.S.C., and to be transfd. to R.F.C., Gen. List ; Temp. 2nd Lieut. C. B. Spurgeon, Essex R., and to be transfd. to R.F.C., Gen. List, Dec. 4th, 1917, seniority from October 19th, 1917. Seniority from Sept. 23rd, 1917 :—Lieut. E. C. S. Ringer, R. Suss. R., T.F. ; Oct. 25th, 1917, and to be secd. Lieut. C. D. Palmer, Arg. and Suth'd Highrs ; Nov. 13th, 1917, and to be secd. Seniority from Sept. 24th, 1917 :—Temp. Lieut, H. L. Walter, Res. Regts. of Cav. ; Oct. 20th, 1917, and to be transfd to R.F.C. Gen. List. Lieut. A. R. Robertson, Canadian Exped. Force ; Oct. 31st, 1917. Lieut. E. D. S. Casswell, Rif. Brig., S.R. ; Nov. 7th, 1917, and to be secd. Temp. Lieut. H. A. Pickford, W. York R. ; Nov. 7th, 1917, and to be transfd. to R.F.C. Gen. List. Temp. Lieut. F. H. R. Law, W. York R., and to be transfd. to R.F.C. Gen. List ; Nov. 17th, 1917, seniority from Oct. 11th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—W. J. Corney ; Nov. 14th, 1917, seniority from Sept. 17th, 1917. J. P. Coleman ; Nov. 19th, 1917, seniority from Sept. 24th, 1917. A. Leggatt ; Nov. 30th, 1917, seniority from Sept. 10th, 1917. Nov. 30th, 1917, seniority from Oct. 3rd, 1917 :—H. Keeton, C. W. Cook.

Balloon Company Commander.—(Graded as a Flight Commander.)—Capt. R. M. Plummer, Bedf. R., T.F., from a Balloon Officer ; Sept. 25th, 1917.

Park Commander.—Lieut. (Temp. Capt.) F. A. J. B. Wiseman, R.A., to be secd., and to be Temp. Major while so employed ; Nov. 5th, 1917.

Equipment Officers, 3rd Class.—Lieut. (Temp. Capt.) A. F. K. White, Suff. R., T.F., from a Flight Comdr., and to relinquish his temp. rank ; Aug. 14th, 1917. 2nd Lieut. A. W. Gilfillan, R. Fus., S.R., from a Flying Officer ; Aug. 21st, 1917. Lieut. R. H. Johnson, R.F.A., T.F., from a Flying Officer ; Aug. 24th, 1917. Lieut. J. A. Rushworth, L'pool R., T.F., and to be secd. ; Sept. 10th, 1917. Temp. Lieut. F. A. George, Gen. List, from a Flying Officer ; Sept. 20th, 1917. Temp. Ormr. and Hon. Lieut. W. A. Cockburn, Gen. List ; Nov. 1st, 1917. Temp. 2nd Lieut. J. C. Holmes, attd. York R., and to be transfd. to R.F.C. Gen. List ; Dec. 15th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—H. W. Arnott ; Aug. 16th, 1917. G. D. Jones, M. G. Church ; Nov. 14th, 1917. J. S. Suckling ; Dec. 10th, 1917. A. Robinson ; Dec. 13th, 1917. A. G. Knight ; Dec. 20th, 1917. A. Randle ; Dec. 29th, 1917.

Schools of Instruction.—Schools of Military Aeronautics.

Assistant Instructors.—(Graded as Equipment Officers, 2nd Class.)—Lieut. H. Tatton, Yeo., T.F., a Flying Officer (Obs.), Lieut. W. S. Harms, Essex R., S.R., a Flying Officer (Obs.) ; Jan. 1st. And to be Temp. Lieuts. while so employed :—2nd Lieut. A. W. Gilfillan, R. Fus., S.R., an Equipmt. Officer, 3rd cl. ; Temp. 2nd Lieut. C. Murchie, Gen. List, a Flying Officer (Obs.).

General List.—Temp. 2nd Lieut. J. L. Des Lauries to be Temp. Lieut. ; Dec. 22nd, 1917. To be Temp. 2nd Lieuts. (on prob.) :—D. L. Holmes, D. Y. Hunter, H. L. Hopkins, M. C. Howell, R. E. L. McBean, R. S. McNair, T. L. McConchie, W. H. McGhee, R. McPhee, L. Miller, R. G. Robertson, J. G. Russell, F. J. Russell, E. N. Ruffle, A. H. S. Maria, H. E. Snyder, A. R. Stewart, A. M. Sanderson, C. R. Titus, A. O. B. Turner, J. Valentine, H. Winkler, H. Wilson, H. A. White ; Nov. 27th, 1917.

Supplementary to Regular Corps.—2nd Lieut. A. W. Porter is placed on the retired list on account of ill-health contracted on active service ; Jan. 22nd.

General List. (R.F.C.).—Cdt. C. R. Bascombe to be Temp. 2nd Lieut. ; Aug. 2nd, 1917 (substituted for *Gazette* notification Aug. 24th, 1917, page 8782, describing name as Buscombe).

London Gazette Supplement, January 22nd.

The following temp. appointments are made at the War Office :—

Assistant Director.—Capt. (Temp. Major) W. T. M. Buller, A.S.C., from a Staff Capt., and to be Temp. Lieut.-Col. whilst so employed ; Dec. 17th, 1917.

Deputy Assistant Director.—2nd Lieut. (Temp. Capt.) H. A. Browne, R.F.C., S.R., from an Equipment Officer, 1st Cl., and to retain his temp. rank whilst so employed, vice Capt. H. A. P. Disney, Camb. R. (T.F.) ; Dec. 4th, 1917.

Staff Captain.—Temp. Capt. H. S. Morton, A.S.C., vice Capt. (Temp. Lieut.-Col.) W. T. M. Buller, A.S.C. ; Dec. 17th, 1917.

The following appointments are made :—

Flying Officers.—2nd Lieut. C. B. D. Campbell, Som. L.I., S.R. ; Dec. 24th, 1917. Lieut. F. J. Simpson, Canadian Exped. Force ; Dec. 27th, 1917. Temp. 2nd Lieut. E. C. Brown, attd. R.W. Kent R., and to be transfd. to R.F.C. Gen. List ; Dec. 28th, 1917.

Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—W. T. Kuschke ; Aug. 19th, 1917. E. R. Stock, H. N. Arthur ; Oct. 13th, 1917. E. P. Graves ; Nov. 1st, 1917. A. L. Huber ; Nov. 7th, 1917. H. B. Turner ; Nov. 8th, 1917. A. G. Taylor ; Nov. 14th, 1917. E. G. Tart, C. L. Cumming ; Nov. 16th, 1917. W. H. L. Graham ; Dec. 12th, 1917. I. K. Patton ; Dec. 22nd, 1917. F. H. Barton, J. S. Boult ; Dec. 23rd, 1917. F. A. S. Nesbit, J. C. Ruse, J. Williamson, M. S. Pettitt, W. J. Gibbs, F. G. Powell, H. Fitz-Gibbon, P. W. Woodhouse ; Dec. 27th, 1917. J. J. Magill, H. A. W. Hopson, W. Dix, H. McDonald ; Dec. 28th, 1917. D. Gardiner, E. H. Masters, W. F. Hiam ; Dec. 29th, 1917. J. A. H. Seyres, W. H. Clarke ; Dec. 30th, 1917.

Flying Officer (Observer).—Temp. Capt. C. T. Cleaver, M.C., Gen. List, from an Equipment Officer, 2nd Cl. ; Nov. 4th, 1917, seniority from Nov. 22nd, 1915.

Assistant Instructor in Gunnery (graded as an Equipment Officer, 3rd Class).—Capt. C. C. Gilbert, N. Zealand Exped. Force ; July 16th, 1917.

Depôt Commander.—Temp. Capt. the Hon. W. C. W. Egerton, Gen. List, from an Adjut., and to be Temp. Lieut.-Col. whilst so employed ; Jan. 15th.

Park Commanders.—From Equipment Officers, 1st Cl., and to be Temp. Majors whilst so employed ; 2nd Lieut. (Temp. Capt.) W. D. L. Jupp, S.R. ; 2nd Lieut. (Temp. Capt.) T. Bullen, Som. L.I. ; Jan. 1st.

Equipment Officers, 2nd Class.—Capt. J. W. G. Mackinlay, S.R., from a Staff-Lieut. ; Dec. 22nd, 1917, seniority from Dec. 14th, 1916.

3rd Class.—Temp. 2nd Lieut. (on prob.) H. C. Nelson, Gen. List, and to be confirmed in his rank ; Sept. 10th, 1917.

General List.—J. Pughe-Jones, late S. Wales Bord. (T.F.), to be Temp. 2nd Lieut. ; Nov. 24th, 1917. To be Temp. 2nd Lieuts. (on prob.) :—F. S. Armbister, J. F. Hewitt, R. W. Hogg, L. J. Kipscomb, W. H. Lawrence, R. A. Leahy ; Oct. 29th, 1917. A. E. Allen, B. G. Bryan, W. M. Clayton, D. Humphrey, R. Q. Hamilton ; Nov. 5th, 1917. H. C. Craig, H. N. Dorling, W. A. Mansfield ; Nov. 12th, 1917. F. J. Belley, F. H. Beaufort, H. F. Balmer, T. S. Byrn, R. T. Balch, H. H. Borden, C. R. Borkland, C. S. Bowen, R. W. Boyce, N. C. Bray, A. E. Bruce, W. E. Buchan, C. McE. Carpenter, W. G. Carmichael, W. Campbell, H. C. Deeks, M. L. Dunham, J. C. Enslen, L. Y. Erskine, H. J. Fitzgibbon, J. E. Fitzpatrick, R. D. Forbes, A. R. Grafton, G. Goad, B. N. Garrett, F. W. Gillet, G. F. Hubbard, W. A. Hunter, J. S. Johnstone, F. R. Knapp, R. A. Kirkpatrick, M. C. Kinney, E. J. Lussier, H. T. B. Lockwood, R. H. Lefebvre, R. C. Muir, C. Murray, M. Marks, L. H. McIntyre, M. E. Miller, L. S. Morange, J. W. Pearson, T. H. Potter, L. W. Prescott, J. M. Schollick, R. G. Searson, H. McD. Sinclair, A. B. Smith, C. De Vitalis, B. K. Adams, W. D. Archer, P. W. Atkins, R. E. Caverhill-Cameron, C. M. H. Cordasco, E. F. Crabb, V. R. Craigie, S. W. Crane, B. S. Crecine, F. W. Crosbie, Le G. Cunningham ; Nov. 27th, 1917. A. V. Roger, B. E. Taylor, G. F. Touchard ; Dec. 4th, 1917. P. F. Parton ; Dec. 28th, 1917. R. M. Duke ; Dec. 29th, 1917. E. H. Jones ; Jan. 7th.

London Gazette Supplement, January 23rd.

The following appointments are made :—

Flight Commanders, from Flying Officers.—Temp. Capt. J. H. Storey, Gen. List ; Dec. 30th, 1917. And to be Temp. Capts. whilst so employed :—2nd Lieut. (Temp. Lieut.) K. Shelton, E. Kent R., S.R. ; Temp. 2nd Lieut. F. D. Grant, Gen. List ; Jan. 4th. 2nd Lieut. E. S. Meek, S.R. ; Jan. 10th.

Flying Officers.—Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—W. Thompson ; Sept. 25th, 1917. J. J. Lanctot ; Nov. 7th, 1917. B. H. McCormack, A. H. Peters, G. M. Duncan ; Dec. 27th, 1917. J. L. Probit ; Dec. 28th, 1917.

Equipment Officers, 2nd Class.—Temp. Lieut. R. R. Frecheville, R.E. ; Dec. 1st, 1917.

London Gazette Supplement, January 24th.

The following appointments are made :—

Flying Officers.—2nd Lieut. C. G. Meudell, S.R. (since killed in action) ; June

17th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—J. N. Bartlett; Sept. 22nd, 1917. A. E. Thompson; Dec. 11th, 1917. K. V. Anderson, H. F. Jones; Dec. 14th, 1917. A. H. Whitford-Hawkey; Dec. 16th, 1917. N. Bury; Dec. 22nd, 1917. L. E. Atha; Dec. 29th, 1917. A. H. Birbeck, E. M. Graddon, J. G. Kerr; Dec. 31st, 1917.

Flying Officers (Observers).—2nd Lieut. P. W. Taylor, R.A., and to be secd.; Oct. 17th, 1917, seniority July 17th, 1917. 2nd Lieut. G. W. A. Green, R.F.A., S.R.; Dec. 9th, 1917, seniority Sept. 11th, 1917. Dec. 10th, 1917, seniority Sept. 24th, 1917 :—Temp. 2nd Lieut. H. Smith, R. Fus., and to be transfd. to R.F.C., Gen. List; Temp. 2nd Lieut. A. W. Lewis, Middx. R., and to be transfd. to R.F.C., Gen. List; Temp. 2nd Lieut. C. T. V. Marshall, Middx. R., and to be transfd. to R.F.C., Gen. List; 2nd Lieut. H. Melling, Ches. R. (T.F.), and to be secd.; 2nd Lieut. C. H. Lawrence, York. and Lanc. R. (T.F.), and to be secd.; Dec. 10th, 1917, seniority Oct. 10th, 1917. 2nd Lieut. H. H. Thompson, Yeo. (T.F.), and to be secd.; Dec. 15th, 1917, seniority Oct. 18th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—E. W. Grant; Dec. 10th, 1917, seniority Sept. 24th, 1917. C. R. Eck; Dec. 14th, 1917, seniority Oct. 11th, 1917.

General List.—The Christian names of Temp. 2nd Lieut. (on prob.) Karl Bertram Sylvester are as now described, and not as in the *Gazette* of Jan. 3rd.

Memorandum.—Capt. C. L. Stewart, Canadian Exped. Force, to be Adjt. of a Cdt. Wing, R.F.C.; Oct. 1st, 1917.

London Gazette Supplement, January 25th.

The following appointments are made :—

Flight Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed :—2nd Lieut. H. Munden, Som. L.I.; 2nd Lieut. J. B. Crompton, S.R.; Jan. 4th. Temp. 2nd Lieut. N. V. Harrison, Gen. List; Jan. 7th. The appointment of Capt. N. H. Bottomley, E. York R., S.R., notified in *Gazette* of Sept. 10th, 1917, is antedated to March 22nd, 1917.

Flying Officers.—Lieut. C. A. Chisnall, Canadian Exped. Force; Temp. 2nd Lieut. P. Macfarlane, attd. K.O. Sco. Bord., and to be transfd. to R.F.C., Gen. List; Jan. 1st. Lieut. H. Lingard, North'd. Fus. (T.F.), and to be secd.; 2nd Lieut. R. A. Spencer, Manch. R., S.R., and to be secd.; Jan. 2nd. Capt. S. A. Flavelle, Canadian Exped. Force; Jan. 3rd. Temp. 2nd Lieuts. (on prob.), Gen. List and to be confirmed in their rank :—A. J. Fisher; Dec. 26th, 1917. B. G. Beardall, F. F. Bonniwell, R. W. Frean, H. O. Irwin; Dec. 27th, 1917. G. T. Verrall, B. C. Budd; Dec. 30th, 1917. K. W. D. Pope, J. M. Goller; Dec. 31st, 1917. H. R. Watt, E. W. Christie; Jan. 2nd.

Equipment Officers, 3rd Class.—2nd Lieut. P. B. Harris, S.R.; Aug. 21st, 1917, seniority from Aug. 28th, 1916. 2nd Lieut. A. W. Hemphill, R.A., and to be secd.; Temp. 2nd Lieut. J. W. Javes, Labour Corps, and to be transfd. to R.F.C., Gen. List; Jan. 1st. Temp. 2nd Lieuts. (on prob.), Gen. List and to be confirmed in their rank :—D. W. Dron, H. Falkner, A. Campbell, A. R. Conder, E. F. Fardon, H. Hilsdon, W. Higson, D. H. W. Alexander, J. M. Floyd, A. F. Rae; Jan. 1st.

Experimental Officer, 1st Class (graded as an Equipment Officer, 1st Class).—2nd Lieut. (Temp. Capt.) C. Porri, Yeo. (T.F.), from an Equipment Officer, 1st Cl., to be secd., and to retain his temp. rank while so employed; Aug. 11th, 1917.

Schools of Instruction.—Schools of Aerial Gunnery.

Chief Instructor (graded as a Park Commander).—Lieut. (Temp. Capt.) J. W. Gordon, S.R., from an Instr. in Gunnery (graded as an Equipment Officer, 1st Cl.), Armament Sch., and to be Temp. Major while so employed; Dec. 12th, 1917.

Armament School.

Assistant Instructor in Gunnery (graded as an Equipment Officer, 2nd Class).—Capt. P. S. Jackson-Taylor, Herts. R. (T.F.), from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 3rd Cl.); Nov. 21st, 1917.

General List.—Capt. J. H. Jackson, ret., to be Temp. Lieut.; May 3rd, 1917, and to be Temp. Capt. (without the pay or allowances of that rank) from Jan. 1st. Temp. Lieut. R. J. Everest relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; Jan. 26th. Temp. 2nd Lieut. H. W. Howieson resigns his commission to resume his medical studies, and is granted the hon. rank of 2nd Lieut.; Jan. 26th. Temp. 2nd Lieut. T. L. Rhodes resigns his commission; Jan. 26th. To be Temp. 2nd Lieuts. (on prob.) :—C. Shears; Sept. 21st, 1917. L. D. Adams, J. T. Andrews, C. C. Boldrick, I. H. Christie, J. C. Douglas, C. J. Humphreys, G. T. Miles; Dec. 4th, 1917. Cdts. to be Temp. 2nd Lieuts. (on prob.) :—T. S. Chilton, N. M. Dales, S. Davidson, B. Digby-Worsley, J. Finnigan, S. E. Grand, A. H. Harrison, F. J. D. Hudson, P. Hughes, J. H. Hay, A. J. Inkster, G. W. Lambert, F. A. Lewis, A. H. Mitchener, R. G. Maskall, R. C. Macaulay, H. N. T. Pearson, H. Stirrup, L. M. Thompson, J. H. Umney, H. Watkins, J. S. Warry, F. F. Walker, F. M. Hawthorn; Jan. 3rd. D. W. Bridge, M. R. De Saxe, P. R. Easton, C. V. Forsyth, B. Rose; Jan. 5th.

Supplementary to Regular Corps.—P. B. Harris, from Temp. 2nd Lieut. Acting Capt.) Tank Corps, to be 2nd Lieut.; Aug. 21st, 1917, seniority July 24th, 1916.

London Gazette Supplement, January 26th.

The following appointments are made :—

Staff Officers, 3rd Class (graded as Staff Captains).—Lieut. (Temp. Capt.) T. M. Eggar, Lond. R. (T.F.), from an Adjt., R.F.C., and to retain his temp. rank while so employd, vice Capt. R. Addenbrooke-Prout, Gen. List; Dec. 28th, 1917. Lieut. T. Fawdry, N. Lan. R., to be secd., and to be Temp. Capt. while so employed; Jan. 1st.

Wing Commanders.—Capt. (Temp. Major) Lord G. Wellesley, G. Gds., from a Sqdn. Comdr., and to be Temp. Lieut.-Col. while so employed; Oct. 1st, 1917. Major (Temp. Lieut.-Col.) J. H. A. Landon, D.S.O., Essex R. (T.F.), from an Asst. Dir. at the War Office, and to retain his temp. rank while so employed; Dec. 27th, 1917, seniority Aug. 13th, 1917. Lieut. (Temp. Major) J. E. A. Baldwin, Hrs., from a Sqn. Comdr., and to be Temp. Lieut.-Col. while so employed; Dec. 28th, 1917.

Flight Commanders.—From Flying Officers, and to be Temp. Capts. while so employed :—Lieut. F. A. V. Cook, Durh. L.I. (T.F.); Jan. 6th. Lieut. W. B. Farrington, Notts. and Derby R., S.R.; Jan. 10th.

Flying Officer.—Temp. 2nd Lieut. B. McPherson, Lab. Corps, and to be transfd. to R.F.C., Gen. List; Nov. 2nd, 1917. (Substituted for notification in *Gazette* of Dec. 5th, 1917.)

Adjutant.—Temp. Lieut. (Temp. Capt.) J. H. Jackson, Gen. List; Jan. 1st.

Equipment Officers, 1st Class.—Major L. N. G. Filon (T.F.), Res.; Dec. 28th, 1917. From the 2nd Cl., and to be Temp. Capts. while so employed :—2nd Lieut. (Temp. Lieut.) P. G. Emery, S.R.; Temp. Lieut. E. Drudge, Gen. List; 2nd Lieut. (Temp. Lieut.) F. H. Tyas, S.R.; 2nd Lieut. (Temp. Lieut.) R. H. Grant, S.R.; 2nd Lieut. (Temp. Lieut.) D. H. Kemp, S.R.; Jan. 1st. 2nd Cl.—From the 3rd Cl.—Qrmr. and Hon. Capt. E. J. Langridge, N. Staff. R.; Jan. 1st. And to be Temp. Lieuts. while so employed :—2nd Lieut. R. Stanley-Smith, S.R.; 2nd Lieut. L. C. Kemp, R.E. (T.F.); Jan. 1st.

Schools of Instruction.—Schools of Military Aeronautics.

Examining Officer (graded as an Equipment Officer, 2nd Class).—Temp. 2nd Lieut. J. Morris, Gen. List, an Equipment Officer, 3rd Cl., and to be Temp. Lieut. whilst so employed; Nov. 5th, 1917.

General List.—Temp. 2nd Lieut. H. C. Bishop to be Temp. Lieut.; July 1st, 1917. Temp. 2nd Lieut. T. C. Griffiths relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; Jan. 27th. Temp. 2nd Lieuts. resign their commissions :—J. J. Davidson, H. G. Marks, T. W. Jackson; Jan. 27th. Sgt. H. Dean, from R.F.C., to be Temp. 2nd Lieut; Jan. 12th. Cdts. to be Temp. 2nd Lieuts. (on prob.) :—E. J. Hodgson-Stevens, J. D. Dalzell; Jan. 6th. K. W. Allman, A. H. Allingham, C. W. Alleway, S. A. V. Austin, H. Auckland, E. A. Bowyer, E. S. Banfield, H. C. Beaumont, D. J. Brooks, V. H. Barnfield, M. W. M. Burnside, G. H. Brown, C. C. Bevington, G. Ballance, T. R. R. Burns, H. Bull, T. F. Bunce, C. S. Colman, S. E. Crookell, E. C. Clarke, J. P. Cross, W. Cole, H. R. Cooke, N. Cooper, J. Cameron, A. L. Courtney-Dunn, J. Clubb, J. A. Clayton, E. H. Duffy, E. Deeks, A. C. Davis, J. G. Dennis, G. E. Dunn, J. H. Drayton, H. Dabney, W. T. Doherty, R. J. Davidson, E. A. Elliott, J. E. Emtage, J. J. Elder, E. Evans, C. G. B. Edwards, C. R. Fraser, R. W. F. C. Frost, C. M. Fraser, A. H. Farrington, C. H. Flinn, R. N. Gosling, R. E. Gorman, C. S. Gray, E. L. Gray, J. G. Galbraith, C. F. Grant, S. S. George, H. L. Howell, A. Harman, D. B. Horsburgh, P. A. Haynes, C. H. Hobson, L. Inggs, H. V. Jones, P. H. Lambert, J. Lightoller, E. H. Lyon-Hall, I. McIvor, L. R. Marsh, A. A. S. Milne, H. L. McLellan, C. T. G. R. Miller, A. McFarlan, J. D. MacFarlane, H. McLean, L. F. Newnham, F. Nicolls, C. E. Nicholas, A. Onions, H. H. Palmer, J. A. Peile, D. H. Prosser, P. Phillips, A. Preston, G. C. Page, E. R. Pemberton, D. R. Pettigrew, G. E. Rollason, E. G. Renton, H. Rhodes, D. C. Rees, H. P. Robinson, E. G. Simpson, F. B. Stark, C. Stobbs, T. F. Scott, F. W. Syer, G. H. B. Smith, R. C. Teen, D. J. Tarling, W. R. Thomson, J. Ure, T. H. A. Vivers, E. J. Wells, C. V. Wheeler, T. P. Wheatley, W. S. Winter, T. Wheeler, R. S. Walter, L. A. W. Webb, G. R. Wells; Jan. 20th.

Memorandum.—Temp. 2nd Lieut. J. G. S. Thomson, R.F.C. (Mil. Wing), is transfd. to Gen. List for duty with Army Sig. Serv.; Nov. 10th, 1917 (substituted for the notification regarding 2nd Lieut. J. G. S. Thomas in the *Gazette* of Jan. 4th, 1917.)

Supplementary to Regular Corps.—2nd Lieut. W. R. Irwin to be Lieut.; Nov. 22nd, 1917. 2nd Lieut. H. Simson relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; Oct. 13th, 1917 (substituted for the notification in the *Gazette* of Oct. 12th, 1917.)

London Gazette Supplement, January 28th.

The following appointments are made :—

Flight Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed :—Temp. 2nd Lieut. V. W. Burgess, Gen. List; Jan. 9th. 2nd Lieut. M. R. Helliwell, S.R.; Jan. 12th.

Special Appointment (graded as a Flight Commander).—Lieut. E. G. N. Grimble, Herts, R. (T.F.), a Balloon Comdr. (graded as a balloon Officer), and to be Temp. Capt. whilst so employed; Dec. 11th, 1917.

Flying Officers.—Capt. G. M. Brawley, Canadian Exped. Force; Dec. 5th, 1917. Lieut. S. A. Puffer, Canadian Exped. Force; Dec. 11th, 1917. Temp. 2nd Lieut. H. G. Bradshaw, Garr. Bn., Suff. R., and to be transfd. to R.F.C., Gen. List; Dec. 12th, 1917. Temp. 2nd Lieut. E. C. Davies, M.C., Gen. List, from a Flying Officer (Ob.); Dec. 19th, 1917, seniority from Jan. 10th, 1917. Temp. 2nd Lieut. H. Austin, Garr. Bn. Suff. R., and to be transfd. to R.F.C. Gen. List; Dec. 20th, 1917. Lieut. H. Towse, Canadian Exped. Force; Lieut. H. Munro, Arg. and Suth'd. Highrs. (T.F.), from a Flying Officer (Ob.), sen. from March 27th, 1917. Temp. 2nd Lieut. R. J. Chisholm, attd. K.O. Sco. Bord., and to be transfd. to R.F.C. Gen. List; Dec. 29th, 1917. Lieut. F. A. W. Nunn, Lond. R. (T.F.), and to be secd.; Dec. 31st, 1917. Temp. Capt. R. K. Thomson, Gen. List, from an Equipment Officer, 3rd Cl.; Jan. 14th, seniority from Nov. 1st, 1916.

Flying Officers (Observers).—Dec. 3rd, 1917, seniority Sept. 10th, 1917 :—Temp. Capt. G. W. Salt, Lan. Fus., and to be transfd. to R.F.C., Gen. List; Temp. Lieut. A. W. Hammond, R.E.; 2nd Lieut. A. W. Summersgill, R.G.A., S.R.; Dec. 1st, 1917, seniority Sept. 18th, 1917. Temp. 2nd Lieut. H. V. R. Hill, York and Lanc. R., and to be transfd. to R.F.C. Gen. List; Dec. 2nd, 1917, seniority Sept. 23rd, 1917. 2nd Lieut. K. L. Bulkley, Hamps. R. (T.F.), and to be secd.; Dec. 6th, 1917, seniority Oct. 4th, 1917. 2nd Lieut. B. R. Raggett, R.G.A., S.R. (since killed in action); Dec. 4th, 1917, seniority Oct. 12th, 1917, Lieut. W. G. Watson, R.F.A. (T.F.), seniority Oct. 19th, 1917, and to be secd.; 2nd Lieut. D. N. Brampton, M.C., Middx. R., S.R., seniority Nov. 11th, 1917, and to be secd.; Dec. 6th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—W. A. Couper; Dec. 3rd, 1917, seniority Sept. 17th, 1917. H. J. L. Kirkpatrick; Dec. 1st, 1917, seniority Sept. 20th, 1917.

Equipment Officers, 2nd Class.—From the 3rd Cl., and to be Temp. Lieuts. whilst so employed :—Temp. 2nd Lieut. A. F. Lang, Gen. List; Temp. 2nd Lieut. A. W. Armstong, Gen. List; Jan. 1st. 3rd Cl.—Temp. 2nd Lieut. W. J. Reid, Gen. List, from a Balloon Officer; July 9th, 1917. Capt. R. Jagger, W. Rid. R. (T.F.), and to be secd.; Lieut. V. E. W. Greaves, W. Rid. R. (T.F.); Temp. Lieut. W. H. Brown, A.S.C., and to be transfd. to R.F.C., Gen. List; Temp. 2nd Lieut. A. C. Parnacott, Lab. Corps, and to be transfd. to R.F.C. Gen. List; Jan. 1st. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—L. Y. Cardall; March 26th, 1917. M. E. Clubine, H. A. Kelly, J. C. Adams, G. W. H. Hogan, J. H. McGee, S. G. Reilly, G. Clark, C. Edwards, R. Johnston, K. B. Sylvester, N. L. S. Kilpin, A. H. S. Synge, M. L. Dobbin, J. H. Higginbottom, W. S. Pavey, C. D. Wright, R. P. Wilmot; Dec. 3rd, 1917. C. R. Evans, N. H. Jenkinson, W. J. Aubert, S. Barrow, C. H. Greenhouse, A. Hill, F. R. Johnson, E. J. Harding; Dec. 29th, 1917. W. W. Grant; Jan. 1st.

Experimental Officer, 2nd Class (graded as an Equipment Officer, 2nd Class).—Lieut. L. F. Peaty, S.R., from an Equipment Officer, 2nd Cl.; Jan. 3rd.

Schools of Instruction.—Armament School.

Instructor in Gunnery (graded as an Equipment Officer, 1st Class).—Temp. Lieut. G. M. Johnstone, Gen. List, from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 2nd Cl.), and to be Temp. Capt. whilst so employed; Dec. 31st, 1917.

General List.—Temp. Lieuts., Gen. List, to be Temp. Capts. (without the pay or allowances of that rank) whilst specially employed :—G. M. Garro-Jones, C. M. Pletts, W. J. R. Sheppard, R. Ferguson; Dec. 18th, 1917. Temp. 2nd Lieuts. to be Temp. Lieuts. :—G. W. Bulmer; Oct. 13th, 1917. H. E. Davies; Oct. 15th, 1917. D. G. McLean; Oct. 30th, 1917. The surname of Temp. 2nd Lieut. Sydney Barrow is as now described, and not as in *Gazette* of Oct. 22nd, 1917. Temp. 2nd Lieuts. resign their commissions :—J. A. Carruthers, C. B. Stratton; Jan. 29th. To be Temp. 2nd Lieuts. (on prob.) :—J. C. Adams, G. W. H. Hogan, J. H. McGee; Oct. 15th, 1917. S. G. Reilly; Oct. 19th, 1917. J. H. Higginbottom, W. S. Pavey, C. D. Wright; Oct. 29th, 1917. R. P. Wilmot; Oct. 31st, 1917. S. G. Tackaberry; Nov. 12th, 1917. Staff Sgt. H. B. George, from S. Afr. Med. Corps; Nov. 16th, 1917. H. W. Watts; Nov. 30th, 1917. B. F. Macdonald; Dec. 4th, 1917. Pte. A. M. R. Nicholson, from Lond. R. (T.F.); Dec. 18th, 1917. Sgt. R. Bonser, from Lab. Bn.; Qr.-Mr.-Sgt. H. J. Burns, from R.F.C.; Dec. 20th, 1917. 2nd Cl. Air Mech. P. H. Bayer, from R.F.C.; Acting Flight Sgt. J. Milsted, from R.F.C.; Sgt. M. B. Barrand, from R.F.C.; Dec. 22nd, 1917. R. L. Finnis, H. Jenks; Dec. 28th, 1917. Acting Mech. W. Dentith, from R.N.A.S.; Dec. 30th, 1917. W. Bye, Spr. C. S. Goode, from R.E.; F. J. Quinlan, Pte. G. L. Platfoot, from H.A.C. (T.F.); 2nd Cl. Air Mech. W. E. Taylor, from R.F.C.; Jan. 17th. Sgt. A. Impey, from R.F.C.; Jan. 14th. F. P. Miller, J. A. Rennie, A. H. Black, H. H. Newman; Jan. 25th.

Aeronautical Inspection Department.

London Gazette Supplement, January 21st.

J. A. Foster to be Temp. Hon. Lieut. while employed as Asst. Inspr., Aeronautical Inspn. Dept.; July 26th, 1917.

London Gazette Supplement, January 23rd.

T. G. Green to be Temp. Hon. Lieut. whilst employed as Assistant Inspector, Aeronautical Inspn. Dept.; June 1st, 1917.

London Gazette Supplement, January 26th.

To be Temp. Hon. Lieut. :—W. G. Manley, whilst employed as Asst. Inspr., Aeronautical Inspn. Dept.; June 1st, 1917.

FLIGHT

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British. *General Headquarters, January 21st.*

"On the 20th inst. the good visibility again enabled our aeroplanes to observe for the artillery all day and to take many photographs in the enemy's forward area. Bombs were dropped throughout the day on various targets, while the enemy in his trenches and in the open was engaged with machine gun fire from the air. One hostile machine was brought down. None of our machines are missing."

War Office, January 21st.

"*Palestine.*—On January 20th our aeroplanes repeated their raids on the enemy camps and stores established near the railway station, two miles west of Sebustieh (Samaria). An enemy aeroplane was driven down out of control. One of our machines, compelled to land within the hostile lines, was destroyed by its pilot and observer before capture.

"During the past three weeks Maan has been effectively bombed three times by British aeroplanes. On each occasion bombs were dropped with great effect on Turkish barracks, supply depôts, and railway buildings, all machines returning safely in spite of heavy anti-aircraft and machine gun fire. On January 4th an enemy aeroplane, attempting to make a reconnaissance from Maan, crashed near the Arab lines and was completely wrecked, both the pilot and the observer being killed."

General Headquarters, January 22nd.

"On the 21st, flying was confined to observation for the artillery and the dropping of bombs in the enemy forward areas, owing to frequent rainstorms. After dark, when the weather cleared, our night-flying machines were very active. They dropped over 200 bombs on aerodromes in the neighbourhood of Courtrai and on the enemy's billets at Roulers and Rumbeke. Raids were also carried out into Germany, two tons of bombs being dropped on the steel works at Thionville, on the large railway sidings at Bernsdorf (30 miles south-east of Metz), and on Arnaville railway junction, just south of Metz. One machine is unaccounted for."

War Office, January 23rd.

"*Italian Front.*—The weather lately has been raw and foggy, but improved yesterday, when several successful artillery shoots were carried out. Aircraft activity has been rather hampered by weather, and very little flying has been possible. The usual patrol activity continues."

General Headquarters, January 23rd.

"On the 22nd inst. there was a great improvement in the weather, visibility being excellent after the rain. A great many hostile batteries were engaged by our artillery with aeroplane observation, and numerous photographs were taken. Nearly 400 bombs were dropped by us on the enemy's billets at Roulers and Menin, on a large ammunition dump near Courtrai, and on other targets in the enemy's forward areas. Several thousand rounds also were fired from our aeroplanes at different ground targets, including hostile troops and transport on roads and active hostile batteries and machine guns. Seven of the enemy's machines were brought down in air fighting, and two others were driven down out of control. A hostile observation balloon was brought down in flames. Two of our machines are missing."

General Headquarters, January 24th.

"Owing to rain, little flying was possible on the 23rd inst. During the night of the 23rd-24th, hostile aerodromes in the neighbourhood of Courtrai were again bombed by our machines, as well as an aerodrome north of Ghent used by the enemy's night-flying aeroplanes. Hostile billets round Roulers were also attacked by us with bombs and machine gun fire. All our aeroplanes returned."

War Office, January 24th.

"*Mesopotamia.*—On January 21st a successful bombing raid was carried out on a Turkish aerodrome at Kifri. One of our machines was brought down by the enemy's anti-aircraft guns. On the same day a hostile aeroplane was forced to land within our lines near Falluja [? Feluja, on the Euphrates, 35 miles east of Baghdad] and was destroyed."

Admiralty, January 25th.

"During January 25th a bombing raid was carried out by naval aircraft on the enemy aerodrome at Varssenaere. Direct hits were made. All our machines returnzd safely.

"On the 23rd instant, in the course of fighter patrols, two enemy aircraft were destroyed, and two shot down out of control. One of our machines is missing."

General Headquarters, January 25th.

"On the 24th instant there was great aerial activity on the northern portion of the front where the weather was good. Hostile batteries were engaged throughout the day by our artillery, with aeroplane observation, and photographs were taken. Over 300 bombs were dropped on Courtrai, Ledeghem, and Douai railway stations, on a hostile aerodrome near Courtrai, and on the enemy's billets west of Cambrai. One of our pilots fired into the hangars on the enemy's aerodrome at Douai with his machine-gun, and other ground targets were repeatedly attacked in this way. In air fighting seven hostile machines were brought down and five others were driven down out of control. Two of our machines are missing, including one which was seen to collide with a German machine during combat.

"As soon as it was dark our night-flying squadrons bombed a German aerodrome north-east of Ghent, as well as other aerodromes near Courtrai and hostile billets round Roulers. In spite of a thick ground mist, which rose after our machines had left their aerodromes, all returned safely. At the same time other night-flying machines carried out most successful raids on several objectives in Germany. Bombs were dropped on the factories at Mannheim, on the Rhine, where direct hits were obtained on a large factory, and also on the docks and on the town. The barracks and railway station at Trèves, the steel works at Thionville, and the railway stations at Saarbrücken and Oberbillig (south-west of Trèves) were also attacked with excellent results. Our pilots report large explosions on all objectives, and that a large fire was caused at Trèves. One of our machines failed to return."

General Headquarters, January 26th.

"After the thick morning mist on the 25th inst. had cleared, there was again great activity in the air. Work with the artillery was continued by our aeroplanes, and a large number of photographs were taken of the enemy's back and forward areas. The large railway sidings at Courtrai and the enemy's billets at Roulers were bombed, as well as other targets. Hard fighting took place all along the line, the results being greatly in our favour. Ten hostile aeroplanes were brought down and six others driven down out of control. One of our machines is missing.

"On the night of the 25th-26th inst. our night-flying squadrons were active as soon as it was dark, their activity continuing until about 3 a.m., when a very heavy mist set in and rendered flying impossible. During the fine period of the night over eight tons of bombs were dropped by us, several pilots doing two trips. Five of the enemy's large aerodromes in the neighbourhood of Ghent were bombed and also billets in the vicinity of Douai. Over 160 bombs were dropped on a new hostile aerodrome west of Tournai. All of our machines returned."

War Office, January 26th.

"*Palestine.*—During the past few days the activity of our air services has been maintained. On January 22nd the enemy camps and depôts on the railway west of Sebustieh (Samaria) were again raided, half a ton of bombs being dropped and several direct hits observed. On January 24th two enemy aeroplanes were wrecked in aerial combats. On January 25th our bombing squadrons surprised a formed body of some 2,000 enemy troops in close formation near Hawara (on the Jerusalem-Nablus road, 4½ miles south of Nablus. Half a ton of bombs were dropped on the hostile column before it could disperse. At the same time a camp of mounted troops was bombed and the animals were stampeded."

General Headquarters, January 27th.

"On the 26th inst. there was very little activity in the air owing to the dense mist. One hostile aeroplane was shot down by anti-aircraft gunfire.

"At about midday on the 27th inst., the railway station and communications at Trèves were successfully bombed by our machines. A heavy mist hung over the objective and prevented our pilots from observing the exact location of the bursts. All our machines returned safely."

Admiralty, January 28th.

"At noon, on January 27th, naval aircraft carried out bombing raids on Aertrycke aerodrome and Engel dump. Both targets were partly obscured by clouds, which rendered observation of exact results difficult. All our machines returned safely."

War Office, January 28th.

"Our aircraft have been active in aerial combats and reconnaissance work. Six enemy machines and two balloons have been shot down during the past week.

"The total number of hostile aircraft destroyed since the end of November, when our machines commenced operations, is 37 enemy machines shot down, two driven down out of control, and four balloons burnt, while only five of our machines are missing."

French. *Paris, January 21st.*

"In the course of yesterday (20th) three German aeroplanes were brought down, two by the fire of our anti-aircraft guns. Besides these, four enemy machines fell within their own lines as the result of fights with our pilots."

Paris, January 23rd.

"In the period from January 11th to January 20th, 10 German aeroplanes were brought down either in aerial combat or by anti-aircraft guns. In addition, it is confirmed that four German machines reported as having been badly hit were, as a matter of fact, brought down in the preceding period. This brings to 19 the number of aeroplanes destroyed by our pilots between January 1st and January 10th."

Paris, January 24th.

"On January 19th Lieut. Fonck brought down his 20th machine."

Paris, January 25th.

"Two German aeroplanes were brought down on January 24th. One of these was brought down by our anti-aircraft guns."

"*Salonica.*—In the Cerna bend an enemy aeroplane was brought down in its own lines."

Paris, January 26th.

"On January 25th our airmen were particularly active. Numerous photographs were taken by our observers, who flew over the enemy zone as far as 30 kilometres behind their lines. More than 300 photographs were taken during the day. Our chaser airmen brought down four German aeroplanes. In addition, our bombing airmen effected various operations on the 25th, and the night following. Eight thousand kilogrammes of explosives were dropped on enemy establishments, notably on the stations at Thionville and Freiburg in Breisgau, on the factories of the Baden Aniline Company at Ludwigshaten, and on the cantonments in the region of Longuyon.

"Our anti-aircraft guns brought down three German machines on January 25th."

"*Salonica.*—In the region of Seres British airmen bombarded Bulgarian encampments and brought down one enemy machine."

Italian. *Rome, January 25th.*

"Hostile aerial activity, which was considerable from the Adige to the Brenta and along the Piave, was withheld on the front lines by bursts of machine-gun fire."

Rome, January 26th.

"The improved atmospheric conditions gave rise to great aerial activity on both sides. Our machines successfully bombarded the enemy's hutments and railway works at Cismon and Primolano. Royal Navy seaplanes effectually bombed military objectives between Sile and Piave. Our own and the Allies' squadrons, cruising and reconnoitring, several times attacked numbers of hostile machines, of which two were shot down by our airmen in the Mt. Zebio region and in Val Sugana, and two others at S. Pietro di Feltre and S. Fior were accounted for by British airmen, who also set two hostile captive balloons on fire in the neighbourhood of Conegliano. Enemy machines dropped some bombs without doing damage on various portions of our trenches."

Rome, January 27th.

"Aerial activity was notable from Lake Garda to the sea. British airmen brought down two machines within the enemy lines and one in flames in the vicinity of Meolo.

"Between 7 p.m. yesterday and dawn this morning enemy aircraft carried out repeated raids on the Plain between the Brenta and the Paive, especially on Treviso and Mestre, where among the victims are to be counted three women and one (?) killed and three women wounded. The greatest material damage was that done to three hospitals at Mestre."

Rome, January 28th.

"Lively aerial activity along the whole front. A hostile aeroplane was brought down by British airmen. During the raid on the night of the 26th-27th inst. an enemy machine brought down by anti-aircraft batteries fell on the southern slopes of Montello. The three pilots, who were uninjured, and included two officers, were made prisoners."

Belgian. *Havre, January 26th.*

"German airmen dropped some 10 bombs in the neighbourhood of Adinkerke without causing any damage."

German. *Berlin, January 21st.*

"During the last two days, 11 enemy aeroplanes and one captive balloon were brought down."

Berlin, January 26th.

"During the last four days, 25 enemy aeroplanes were brought down in aerial fighting or by gunfire from the ground. Our airmen carried out successful attacks on the north coast of France; in Dunkirk, Calais, and Boulogne good effects were observed. Yesterday, within a few minutes, Lieutenant Roeth brought down in flames three French captive balloons."

Turkish. *Constantinople, January 21st.*

"Between Akbasch and Kilia a vigorous aerial engagement took place. 1st Lieut. Cronois went up against four enemy airmen and shot down one of them. Another enemy airman, after a fight, made off when pursued."

Constantinople, January 24th.

"In the Irak enemy aeroplanes undertook an attack on Kifri, one of them being shot down by our anti-aircraft guns. As retaliatory measures our airmen successfully attacked an enemy encampment near Kasr-i-Shirin. We captured a cavalry patrol."

Constantinople, January 25th.

"*Palestine Front.*—Little fighting activity has taken place."

Casualties.

Second Lieutenant GEO. A. CLAYPHAN, R.F.C., who was killed on December 4th, was the eldest son of Mr. and Mrs. F. Clayphan, Trent Hall, Owston Ferry, Doncaster. He was educated at the Grammar School, Thorne, where he had a brilliant career. At the age of 15 he passed an examination second in the United Kingdom with seven distinctions, gained many certificates and valuable prizes, was head boy and captain of his school, was a crack shot, a keen lover of sport and a good all-round athlete. On leaving school he was an articled pupil to Messrs Brundell and Brundell, Civil Engineers, Doncaster, where after serving a short time he joined the R.F.C., receiving his commission in July, and in three months became an expert pilot, gained his wings, and was appointed a flying officer in October, finishing his advanced training at Hursley Park, Winchester. He went to the front on December 1st, as an artillery observation scout, and was killed while flying on December 4th. The young officer was of fine physique, standing 6 ft. 2 ins., and was 19 years of age.

Second Lieutenant MURRAY G. GUNN, R.F.C., who was missing since December 7th, and is now reported by the enemy as killed, was the eldest son of Mrs. Andrew Gunn, Toronto, Canada. He was aged 21 years.

Probationary Flight Officer WILLIAM ERIC FLOYD, R.N.A.S., who was killed while flying on January 21st, in his 19th year, was the eldest son of Dr. W. R. and Mrs. Floyd, of Devonshire Road, Claughton, Birkenhead.

Major R. N. FORD, M.C., acting commander of a battalion, Royal Fusiliers (captain, Royal Fusiliers), was accidentally killed on January 6th while attending a flying course, aged 33. He was the youngest son of Mr. and Mrs E. S. Ford, of 17, Hyde Park Square, W., and Pengreep, Perranwell, Cornwall, and was educated at Temple Grove, Rugby and Sandhurst. He entered the Army in 1903, and was gazetted captain in 1912. He was twice wounded in the second battle of Ypres, and received the Military Cross in January, 1917.

Lieutenant HENRY PERCIVAL FREEMAN, Canadian Forces, who was accidentally killed while flying in England, on January 21st, aged 28, was the younger son of Mr. and Mrs. Edmund Freeman, of Willesden Lane, N.W.

Lieutenant JAMES GARNET SCOTT, R.N.V.R. (attached R.N.A.S.), who has died suddenly on January 25th whilst serving at an R.N. depôt, was the only son of the late W. M. Scott, M.D., and Mrs. Scott, 37, Queen's Gate Gardens, S.W., and grandson of the late W. Chaplin, of St. Catharines, Ontario.

Second Lieutenant ARTHUR ROWLAND TAYLOR, R.F.C., who was accidentally killed while flying in Hampshire on January 19th, aged 21, was the second son of Mr. R. C. Taylor and Mrs. Taylor, of Millswood House, South Brent, Devon, and late of Westfield, Berkhamsted. He was educated at Berkhamsted School, and went to America in March, 1913. He joined the Canadian R.F.C. in June, 1917, gained his wings, and came to England to finish his training last November.

Second Lieutenant ANDREW RUSHWORTH WARD ("DAN"), R.F.C., the only surviving son of Mr. and Mrs. Horace R. Ward, of Rosedale, Petherton Road, Highbury, N., born April 16th, 1898, was accidentally killed while flying on January 21st in Lincolnshire, during the final stage of his training. He was at Highbury Park School until the end of 1911, and at Merchant Taylors' School until the end of 1914, being a member of the O.T.C. for over two years. He was in camp at Rugeley, Stafford, at the outbreak of the war. On attaining the age of 18 he joined the Queen's Westminster Rifles, and obtained his commission in the R.F.C. on August 16th last.

Married.

On January 23rd, at Christ's Church, Woburn Place, W.C., Sub-Flight-Lieut. FREDERICK WILLIAM CASTLE, R.N., son of Frederick James Castle, was married to FLORENCE ISABEL ROBINSON, daughter of the late Alfred Robinson and granddaughter of the late Rev. Canon Dixon.

On January 26th, at St. Peter's, Eaton Square, London, Lieut. WILLIAM EARDLEY HARPER, M.C., R.F.C., son of Canon and Mrs. Harper, Dunimarle, Culross, was married to MURIEL, daughter of Mr. and Mrs. FREDERICK HAYNES, Hillmorton Road, Rugby.

On January 17th, at St. James's Church, Bushey, Capt. J. JENSEN, R.F.C. was married to GWYNIFRID B. PALMER.

On January 12th, at the Chapel Royal, Savoy, London, Col. THOMAS ANDREW POLSON, A.O.D. (attached Air Ministry), was married to ELIZABETH, widow of F. A. LINDSAY-SMITH, J.P., C.C., of 18, Sussex Place, Regent's Park, N.W.

On January 25th, at St. Marylebone, Capt. A. E. THOMAS, late R.F.C., was married to ELSIE, youngest daughter of Mrs. J. W. PARRISS, of London.

The marriage of Lieut. STUART ARTHUR VILLIERS, R.F.A. and R.F.C., only son of Arthur Villiers, I.O.D., and Mrs. Villiers, Craig's Ville, Simla, India, to VIOLET MARY, eldest daughter of B. W. WHYTE, Esq., and Mrs. Whyte, 39, Mountjoy Square, Dublin, took place on December 26th, 1917, at St. George's, Dublin.

To be Married.

The engagement is announced of Lieut-Col. J. A. CHAMIER, D.S.O., Indian Infantry and R.F.C., son of Major-General F. E. A. Chamier, C.B., C.I.E., and of Mrs. Chamier, 55, Warwick Road, S.W. 5, to EDWINA RATCLIFFE, only daughter of Mr. and Mrs. LORDLY, Chester, Nova Scotia.

A marriage is arranged between ROBERT LAMBART DUNVILLE, Grenadier Guards, eldest son of Wing-Commander John Dunville, R.N., and Mrs. Dunville, and PHYLLIS, elder daughter of Captain and Lady JANE SEYMOUR COMBE.

An engagement is announced between Capt. ALAN GOODFELLOW, R.F.C. (S.R.), younger son of Mr. and Mrs. Benj. Goodfellow, of Birkdale, Lancashire, and Miss CHRISTINE M. BOSTON, daughter of Mrs. Boston and the late John Boston, of Wyburn, Birkdale.

The marriage arranged between Capt HENRY R. KAVANAGH, Royal Irish Fusiliers and R.F.C., and SYLVIA, younger daughter of Mr. and Mrs. JAMES MARTIN, will take place at Long Ditton Parish Church, on February 2nd, at 2 p.m.

A marriage has been arranged, and will shortly take place, between Captain ALEXANDER F. LIVINGSTONE, R.F.C., eldest son of the late Frederick Livingstone and Mrs. Livingstone, 33, Queensborough Terrace, Hyde Park, and JEANETTE MARGARET GRAHAM, younger daughter of ALEXANDER H. COOPER, W.S., 54, Manor Place, Edinburgh, and Glenturret, Crieff, Perthshire.

A marriage has been arranged, and will shortly take place, between D. T. DEWAR MURRAY, attached R.F.C., and Mrs. R. WARREN VERNON, of Lamancha House, Peeblesshire, temporarily residing at 13, High Park Gardens, Kew, Surrey.

An engagement is announced between CHRISTOPHER NEVILE, R.F.C., second son of Mr. and Mrs. Nevile, Skellingthorpe Manor, Lincoln, and VERA, daughter of Mr. and Mrs. BRANTINGHAM BURTT, Wellingore Grange, Lincoln.

An engagement is announced between Lieutenant WILLIAM DONSTON WAIN, R.N.V.R., R.N.A.S., and NESTA SYBIL, younger surviving daughter of the late ROBERT FORREST of Calderhead, Lanarkshire, and Mrs. Forrest, New Court, Marlow.

Triple Fatality in Canada.

Three aviators who were training at the aviation school at Toronto were killed on January 21st. Two cadets, McMillan and Milne, collided and fell. The machine of a third victim, Cadet Axel George Bendix, fell from a height of two hundred feet.

FLIGHT

QUESTIONS IN PARLIAMENT.

Air Raids in Germany. British and French Officers.

MR. BUTCHER on January 22nd asked the Under-Secretary of State for War whether he has any information to the effect that hundreds of British and French officers, prisoners of war, have been sent to Stuttgart or other places in order to be subjected to air raids; and whether he will consider the desirability of sending Germany officers, prisoners of war, from Donington Hall and elsewhere to London or other places where they will be subject to the risk of German air raids on non-combatants and women and children, and of utilising Donington Hall as a hospital for our wounded soldiers?

Mr. Macpherson: Inquiries are being made as to the establishment of camps for prisoners of war in Germany in places particularly liable to air raids.

Mr. Butcher: Do I understand my hon. friend to say that inquiries are being made as to prisoners of war in this country?

Mr. Macpherson: No; I did not intend to convey that. I do not think my hon. friend can take any other than the answer I have given. We are trying to substantiate certain rumours which have reached us as to the placing of our prisoners of war in air-raided parts of Germany.

Mr. Billing: Can the hon. gentleman state now that, if we discover this to be so, we shall act by way of reprisals?

Mr. Macpherson: I think the Air Minister has already made a definite statement upon that point.

Territorial Officer's Transfer to R.F.C.

COLONEL SANDERS on January 23rd asked why the rank of an officer of the Territorial Force who was gazetted captain on August 1st, 1914, and subsequently seconded for service with the R.F.C., should be now dated January 2nd, 1915?

Mr. Macpherson: If my hon. and gallant friend will give me the name of the officer and details of the case, I will endeavour to give him an answer.

Anti-Aircraft Corps.

MR. CHANCELLOR asked the Under-Secretary of State for War if it is the intention of the War Office to dispense with the services of the half-time men of the Royal Naval Volunteer Reserve of the Anti-Aircraft Corps who for the past three and a-half years have manned the searchlights in London, and to replace them with whole-time men; if he is aware that most of these are business men above military age whose experience and efficiency have repeatedly received official commendation, who are desirous of continuing their service to the end of the War, and whose supersession will make an unnecessary additional demand on our man-power; and if he will have the matter reconsidered before taking action?

Mr. Macpherson: These men do not give half-time, but a third of their time. Recent developments in searchlight training have necessitated a higher degree of training and efficiency, which can only be achieved by whole-time men. A sufficient number of half-time men will be re-engaged from the present personnel for duties which can be efficiently performed by men who can only give that amount of time.

Mr. Chancellor: Are they all being invited to volunteer for half-time?

Mr. Macpherson: I am not aware of that, but I will inquire.

Mr. Chancellor: What is to become of these men who have been giving their services all these years, and are quite willing to go on, but are business men who must give some of their time to their business?

Mr. Macpherson: I will inquire into all that, but the hon. member must realise that the Army is concerned in the main with whole-time service.

The Defence of London.

MR. BROOKES on January 24th asked who is now responsible for the defences of London against enemy aircraft attack?

Mr. Macpherson: Major-General E. B. Ashmore, under the orders of Field-Marshal Lord French.

Air Services and Unfit Officers.

MR. SHIRLEY BENN asked the Parliamentary Secretary of the Air Council what principle is adopted in dealing with flying men who, after being thoroughly trained, are found to be unfit for further flying; and are they still kept in the force and, although not flying, allowed to draw flying pay in addition to their ordinary pay?

Major Baird: Pending the formation of the Air Force, this matter is determined by the Admiralty as regards the Royal Naval Air Service and by the War Office as regards the R.F.C. The practice is, as I am informed, in both Services, that officers who are found unfit for further flying cease to draw flying pay. As far as possible those whose unfitness is due to long and efficient service or to wounds or injuries are given other employment.

A SCREW-DRIVING ATTACHMENT.

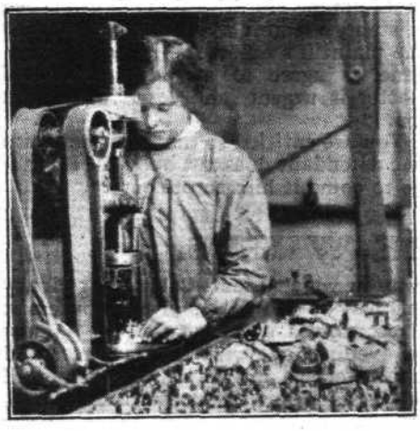
IF screws are to be used in woodwork it is as well that they should be driven home in a proper manner; otherwise their advantages are to a large extent nullified. Yet, how often are screws hammered in with a "Curtain-road screw-driver." This makeshift may serve its purpose under certain conditions but in aeroplane construction where the woodwork requires to be of the best quality, the screw should be used in the orthodox manner. If they are screwed home by hand it is a time-consuming operation—especially when small screws are being handled—but it is now no longer necessary to waste precious time in that way, for Messrs. Russell Brothers, of Redditch, have devised a most ingenious little attachment which can be used on almost any drilling or boring machine. It is self-feeding; a number of screws are thrown into the hopper and they are automatically separated and supplied singly to the delivery nozzle. When the screw is ready for driving it is in full view of the operator who has only to bring down the sensitive feed lever of the drilling machine and the screw is driven home. As one screw is driven home another is fed down to take its place in the delivery nozzle; so by simply working the lever up and down the screws are driven home just as quickly as the operator can get the work into position. The entire screw-driver being raised and lowered with the machine spindle, successive screws may be driven into the work at varying heights from the machine table without re-adjustment.

The screws are actually driven home not simply pushed into the work; a revolving blade engages the slotted head of the screw and screws it into the wood. When the screw is home its resistance releases a clutch and so allows the screw-driving blade to remain stationary until it is withdrawn from the head of the screw. This resistance may be adjusted to meet varied requirements by a simple torsion device.

Some idea of the time-saving qualities of the attachment can be gleaned from the calculation that a girl or youth operating one ten hours a day could drive home one million screws in six months, whereas a man with a screw-driver working the same hours would require four years for the job.

In cases where the wood is of sufficient section to obviate splitting screws may be driven into hard wood without previous drilling. Although the attachment is largely used in connection with wood work it can also be utilised in connection with metal to metal screws and a large number of machines are now doing this kind of work.

In the attachments as at present made it is necessary to take the work to the machine but it is recognised that there is a great deal of screw-driving about an aeroplane which cannot be dealt with in that way. To meet such cases we understand they are bringing out a further development in the shape of a portable power screw-driver, which can be taken to any part of the job.



The Russell screw-driving attachment as used on a drilling machine.

All who use screws in quantity would do well to get into touch with Messrs. Russell Brothers, who would be pleased to demonstrate their device, and once seen the attachment sells itself.

Aero Engines from Canada.

A *Canadian Daily Record* telegram reports that the first of 1,000 aeroplane engines which are being built in Toronto has been completed and tested with satisfactory results. The engines are being constructed at a plant worked by the Imperial Munitions Board.

From Huddersfield to Canada.

IT has been decided that the aeroplane for which funds are being raised, under the auspices of the Imperial Air Fleet Committee in Huddersfield, shall be presented to Canada, The formal presentation ceremony is to take place on Saturday, February 9th, when the aeroplane will be received by Sir George Perley, Agent-General for Canada.

Assisting Aviation in Canada.

The Canadian Aviation Fund, of which Capt. D. A. Cameron, of the Bank of Commerce, is the treasurer, now exceeds £30,000, says the *Times* correspondent in Toronto. The fund provides for 16 aeroplanes, 10 of them training planes to be made and used in Canada, and six for operating against the enemy.

More Attacks on Zeebrugge.

AERIAL attacks were made on Zeebrugge during the evening of January 21st and the afternoon of January 22nd, reports the *Telegraaf*. On the second occasion a large aerial squadron was observed and heavy anti-aircraft fire was heard. The correspondent of the *Telegraaf* learns that military points near Ghent were bombed.

LEGAL INTELLIGENCE.

Cowper-Coles Aircraft Co., Ltd.

IN the Chancery Division of the High Court of Justice on January 25th, Mr. Justice Neville heard an action to restrain the defendant, Mr. Sherard Osborn Cowper-Coles, from purporting to act as a director of the plaintiff company or from interfering with the management of the company's business, and from entering upon the company's premises, and from giving orders to, or interfering with, workmen or servants of the company.

From the affidavits and counsel's statement it appeared that the company was incorporated in June, 1917, as a private company under the Companies Acts, 1908 and 1913, with a capital of £6,000, afterwards increased to £16,000, and the amount of capital issued as paid up was £4,252. The company was established chiefly to manufacture and sell aircraft. It was a controlled establishment under the Munitions of War Act, 1915, and was exclusively engaged in executing several contracts for the Government. There were five directors, of whom the defendant was the chairman. The defendant had become largely indebted to the company for moneys advanced, and on January 15th last the company issued a writ against him in the King's Bench Division for £3,000. There was also a judgment debt against him from a bank for £1,300.

In these circumstances the board of the company came to the conclusion that the defendant was commercially insolvent, and accordingly, on January 14th last, they informed him, by letter through the secretary, that, under Article 21 (*a*) of the company's articles of association he had vacated his office of director and that he must no longer interfere in the company's affairs. The defendant did not acknowledge the letter and he continued to hold himself out as a director of the company and refused to permit any servant or workman to come to the company's works except those who were engaged by him. He gave orders that the workpeople were to take instructions from no one but himself, and picketed the works with four men, with instructions not to allow the inspectors or the general manager to go on the company's premises.

Mr. Harold Solomon Simmons, for the defendant, asked that the motion might stand over for a week to enable the defendant to answer the plaintiff's affidavits.

Mr. Jenkins: I decline to agree to an adjournment of the motion, as the matter is urgent, and I move *ex parte* for an interim injunction.

Mr. Justice Neville: You are entitled to that on the plaintiff's affidavits, and if the defendant does not obey the injunction I shall not hesitate to commit him to prison.

SIDE-WINDS.

THE extraordinary way in which Lieut.-Colonel Sir Henry Fowler, K.B.E., won his way to the hearts of the workers at the Royal Aircraft Factory was demonstrated in a most emphatic manner a few evening ago when he was presented with a silver tea and coffee service and kettle, in token of all he had been to the workers, of all his understanding of them, and of the human interest he had taken in every phase of their life. There was a large gathering of the workers in the new canteen, which is one of the many improvements effected in the factory during the 15 or 16 months Sir Henry Fowler has been Superintendent, the Chair being taken by Mr. P. A. French, who is Chairman of the organised Trade Committee, through whom the presentation was made. Mr. French said he was quite unable to enumerate all the different acts Sir Henry Fowler had done which made for greater comfort in their work, but he instanced three which were appreciated by the workers: Firstly, increased accommodation; secondly, the way he had met them on questions concerning work in the factory; and thirdly, the way in which the coal shortage was met last winter.

The formal presentation was made by the Rev. Basil Phillips, and Sir Henry Fowler, who was given a rousing reception, said his greatest regret, his whole regret, in parting was that he would not be able to keep in such close touch with them any friends that he had found at Farnborough. Like everyone else he had been a worker, and he hoped to continue a worker to the end. He had said many times that apart from any question of whether it is right or wrong, no man worked, and I believe no girl worked as well as they would do, without they were working as comfortably as they could be, not only during the working hours, but in the hours that come afterwards. After all was said and done, he thought what he had been able to do was very little indeed compared with what he should have liked to have been able to do. He thanked them from his heart not only for the very handsome present, but for what he valued so much more, their friendship and kindness to him during the time he had been at Farnborough.

During the evening an excellent concert was given.

A VERY useful booklet comes to hand from Messrs. H. Rollet and Co., of 34, and 36, Rosebery Avenue, London, E.C., which sets forth in a small compass, gauges, weights, &c., which are mostly in use by aeroplane and aero-engine manufacturers at the present time. It gives dimensions of Imperial and Birmingham gauges, B.A. sizes, Whitworth nuts, weights of copper and brass sheets, copper and brass rods, copper and brass wire, brass tubes and fraction and decimal equivalents. A copy of the booklet will be sent to anyone sending a trade card to Messrs. Rollet and Co.

A LITTLE development in connection with Wakefields', who are famous for "Castrol." The full style of the firm is now C. C. Wakefield and Co., Ltd.

LIEUT. LOUIS NOEL was honoured with an invitation to the annual luncheon given by the Lord Mayor to the members of the Court of Common Council on January 23rd. This function took place in the historic dining hall at the Mansion House, and Lieut. Noel accompanied Sir Charles Wakefield, Bart., and Mr. Douglas W. Thorburn.

THERE has been such a run on the Palmer Calendar this year that they have now entirely run out of stock, and paper restrictions at the moment are so drastic that Palmer Tyre, Ltd., are unable to issue a reprint.

NEW COMPANIES REGISTERED.

MIDLAND MOTOR CYLINDER (ALUMINIUM) CO., LTD., 38, Sandon Road, Edgbaston.—Capital £10,000, in £1 shares. Motor Cylinder casters, general founders in aluminium, &c. First directors: H. H. B. Pearce, A. E. Pearce and P. Pritchard.

NORTHWOLD AIRCRAFT CO., LTD.—Capital £3,000, in £1 shares. Permanent directors: F. A. Greaves, A. J. Lyons, F. M. Davis, A. Thomas, and S. J. Gliksten (all British).

SPRINGTHORPE, LTD., 35, Devonshire Street, Winson Green, Birmingham.—Capital £2,000, in £1 shares. Acquiring the business of an engineer carried on by W. H. Springthorpe at 135, Devonshire Street, Winson Green, Birmingham; manufacturers of tension screws and nuts for aircraft, box tools for capstan lathes, aircraft components, motor accessories, &c.

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Applied for in 1917.

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